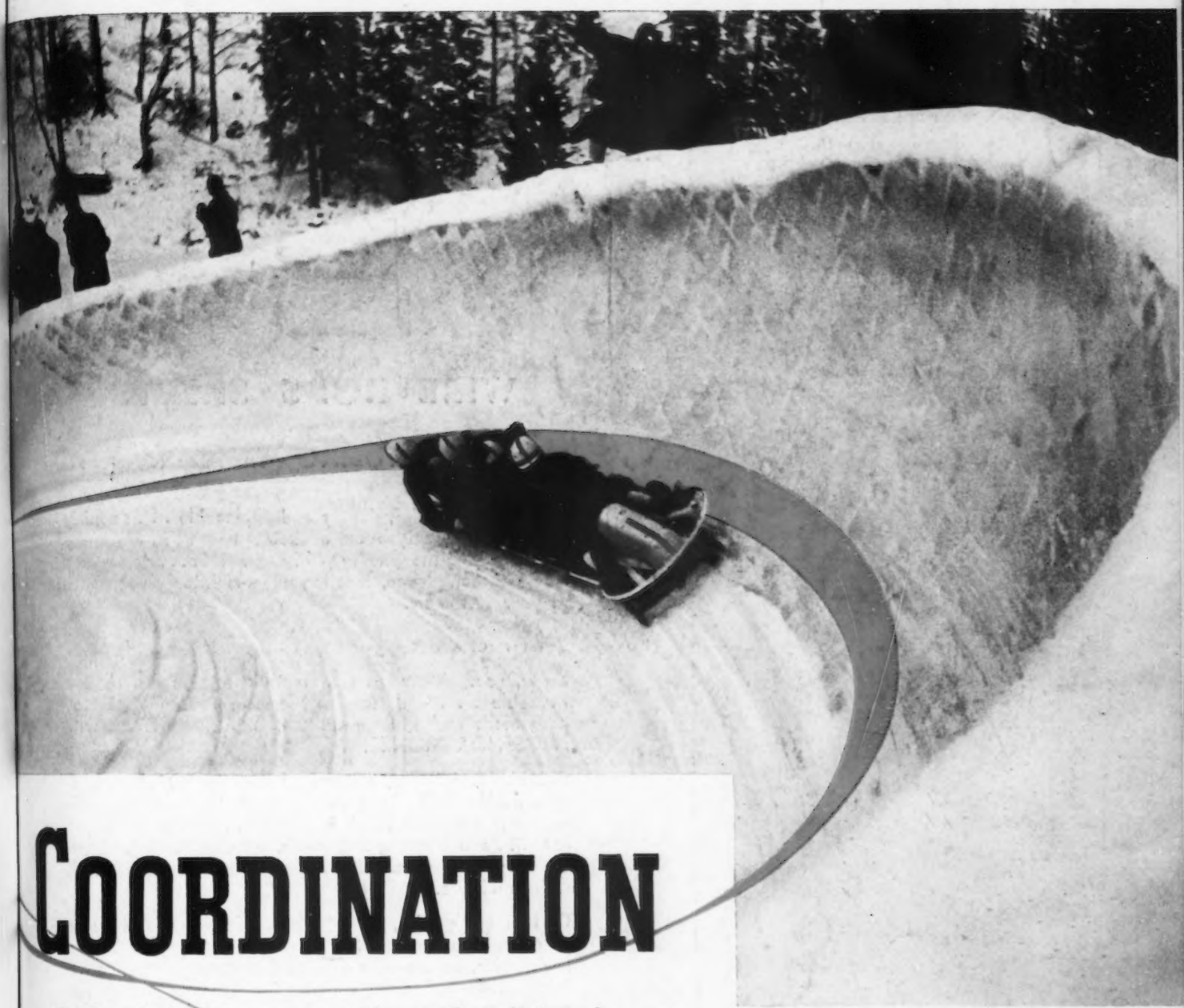
DECEMBER 3, 1936

THE IRON AGE

DEC 3 - 1936



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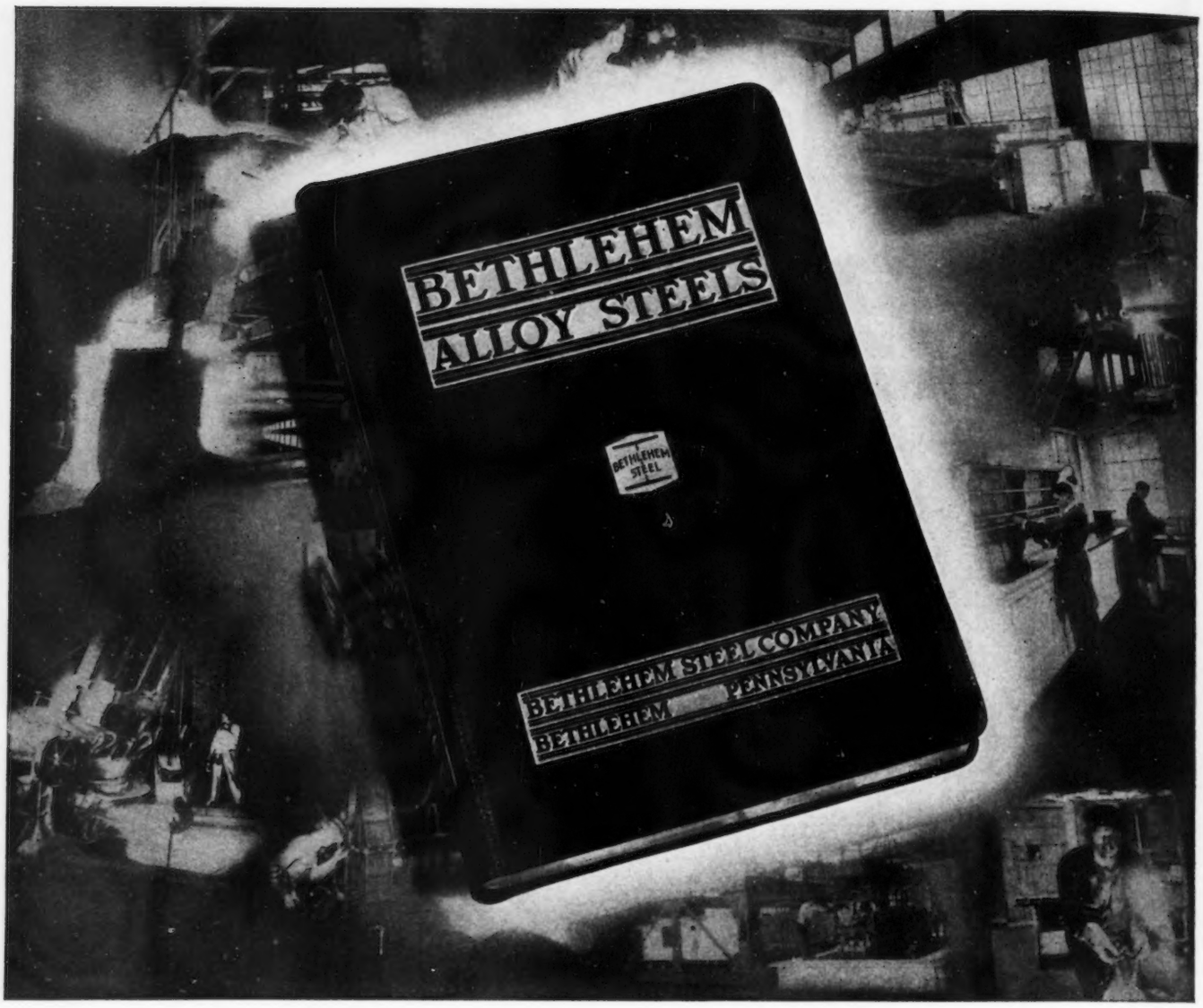

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DECEMBER 3, 1936

ESTABLISHED 1855 Vol. 138, No. 23

Lest There Be Forgotten Men

IN this happy post-election atmosphere of peace on earth and good will toward men, with wage increases of industrial workers daily occupying our headlines—and price increases following on their heels—we must be careful that magnanimity is tempered with justice.

Where the accelerating upward spiral of wages and prices is going to land us nobody really knows. We hope sincerely that it may be in the promised land of prosperity for all and a better living for those at the foot of the ladder. There are skeptics, however, who say that it may lead to the desert of inflation where the mirage of prosperity is never nearer than the horizon.

We do not take that stand at this time. A little inflation is not a bad thing when the business activity curve is turning constantly upward. Certainly it is not as bad as the deflation which takes place on the downward spiral of depression.

The thing that we are chiefly afraid of, in connection with the present upward spiral that is being built in industry, is that it may leave forgotten men and women behind. Some of them have not yet caught the elevator.

Currency inflation spreads itself evenly over rich and poor alike. But wage and price inflation is discriminatory. Those who do not catch the elevator are out of luck.

I am thinking especially of the lower salaried white collar employees of industry.

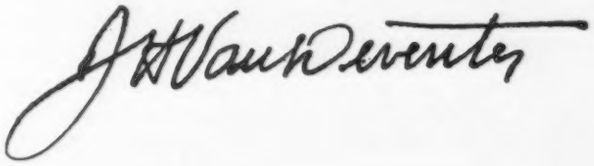
It is quite true that these clerical and other white collar workers have certain advantages over the hourly wage earner with respect to regularity of income and work. Many, if not most of them, receive vacations with pay. In the majority of cases, they are not "docked" for occasional absence because of illness. Granting all of this, we must admit that these advantages have already been "discounted" in establishing white collar salaries.

Admitting, however, that our industrial concerns have exercised a spirit of fairness in establishing pay differentials between various classes of workers in the past, there is a danger of unfairness in an ascending wage-price spiral.

If we are wise, we will take this into account. If there is to be a general increase for those of us who wear overalls, there should be proportionate adjustments for those who do not, among the lower salaried workers.

We do not have to worry about the higher salaried people. They are better able to take care of themselves under the law of supply and demand in a rising market for special ability.

Our consideration should be for those at the broad base of the pyramid, no matter what sort of working uniform they wear.



RECLAMATION, CONDITIONING and HANDLING of FOUNDRY SANDS*

By LESTER B. KNIGHT, JR.
National Engineering Co., Chicago

THE author's thesis is that even small foundries will find it profitable to install equipment for controlling permeability, bond strength, moisture and inert fines of the sands used in molding. Detailed descriptions are given of modern equipment designed for this type of control, and mention is made of the mechanical results obtained and the monetary savings effected through the use of such equipment. It is emphasized, however, that equipment alone will not result in such savings, for there must be a rational use of the machines to solve the individual problems at each foundry.

THE subject of sand reclamation and reconditioning is closely allied to the subject of sand control. In fact it is the writer's experience that without sand control most comprehensive programs of sand reclamation will prove unsatisfactory over a period of time.

Much knowledge has been gained in the past ten years on this subject and many improvements have been developed in equipment for reclaiming, conditioning and controlling foundry sands.

The subject of sand control is a large and important one and many papers have been written on various phases of the problem. Much of the subject is beyond the scope of this paper, which will deal largely with equipment operated in the field for reclaiming and conditioning foundry sand.

Foundrymen should realize the importance of a study of the sand conditions in their foundries, the effect upon the quality of product they produce and the opportunity this phase of their operations presents for improvement in quality and reduction in cost of manufacture of their product.

During the past few years the writer has had the opportunity to conduct "sand surveys" in many different classes of foundries. Almost invariably where the causes of scrap loss are classified, the sand is "credited" with from 40 to 60 per cent of the daily foundry loss. If the classification of losses is correct, a well rounded sand conditioning and control program should reduce materially these losses attributable to sand.

Equipment for handling, condi-

*Submitted as the exchange paper of the A.F.A. for presentation at the 1936 meeting of the French Foundry Technical Association.

tioning and reclaiming sand should provide means for controlling the most important variables in the sand. Assuming that the grain structure of the sand used is suitable for the class of casting to be made, the variables to be controlled are (1) permeability, (2) bond strength, (3) moisture, and (4) inert fines. Each of these variables are inter-related and each has its effect on the other properties of a given sand. The question arises as to how these variables should be controlled and the limits to which they should be controlled.

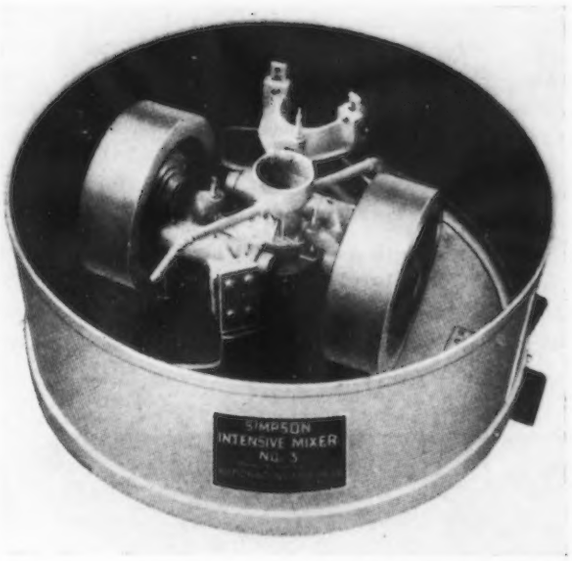


FIG. 1—A batch type muller used to a considerable extent for conditioning foundry sands.

Permeability:

In general the permeability of the sand should be sufficiently high to allow for the free passage of gases when the metal is poured. Too open a sand may cause rough castings or metal penetration, both of which are undesirable. Too close a sand may cause scabs, blows or gas holes, which are also undesirable. The allowable limits of permeability for a given class of castings must be determined empirically and by observation of casting results after the castings are cleaned. The sand should be controlled within that range of these limits.

Bond and Moisture:

Many tests have proved that an excess of bond or moisture, or both, causes a majority of sand defects. The most satisfactory molding sand, natural or synthetic, will have a minimum of bond and moisture required for workability. The sand must be sufficiently workable to allow a clean impression of the pattern, allow finishing and closing of the mold and prevent cuts, washing, swells, etc. If an excess of bond, moisture or both is present there usually results scabs, excessive burning on, rough castings, blow holes, etc., all leading to excessive losses and high cleaning costs.

It is extremely essential that the bond and moisture be uniformly distributed in the sand. The most desirable condition is to have each grain of sand uniformly coated with a film of clay and tempered with a minimum of moisture required for workability. For this tempering and bonding of the sand the batch type muller is most widely used and the highest degree of uniformity obtained.

Importance of Mulling Sand:

Fig. 1 shows one of the larger size batch type mullers most widely used for proper conditioning of

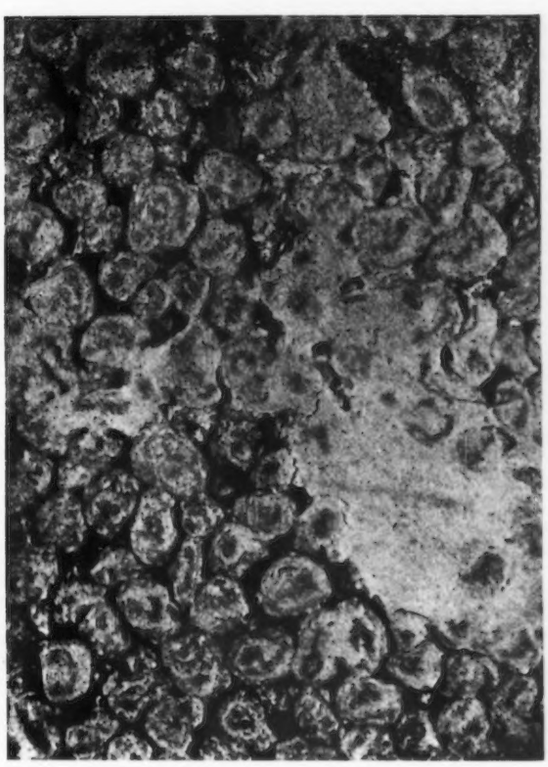


FIG. 2—Photomicrograph of a mold surface made of sand prepared in a paddle type mixer. Note the smear of unmixed clay.

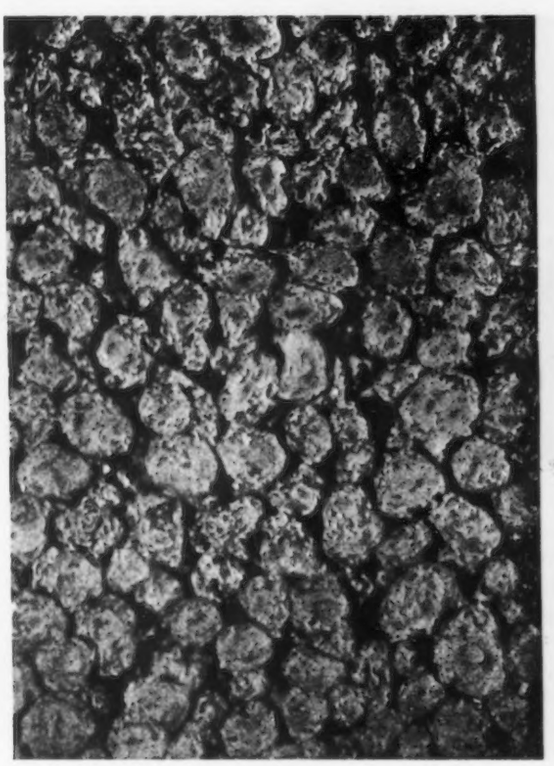


FIG. 3—Photomicrograph of a mold surface of sand prepared in a batch type muller. Note the film of clay around each grain of sand.

foundry sands. The mulling action thoroughly coats each grain of sand and develops the maximum plasticity of the clay with a minimum of moisture. Hence a minimum of clay or bond and moisture is required for workability when the sand is mulled.

Tests have been made to determine the importance of uniform bond distribution and the effect of mulling the sand. Fig. 2 shows a photomicrograph of a part of a mold surface made from sand prepared in a paddle type of mixer with six minutes of mixing. Note the smear of unmixed clay. When the metal was poured in this mold the casting surface was very dirty due to the burning on of the sand at these points.

Fig. 3 shows a photomicrograph of a part of a similar mold surface made from the same sand mixed for four minutes in a muller type mixer. Note the film of clay around each grain of sand and that no unmixed clay is present. When the metal was poured in this mold the casting surface was smooth and peeled readily.

Strength as Affected by Clay and Moisture:

Ordinarily a sand with a given percentage of clay content and optimum moisture content, when mixed in a muller, will show from 25 to 60 per cent greater green strength and from 60 to 300 per cent greater dry strength than the same sand mixed in a paddle type of mixer. This is due to the greater uniformity of distribution of the clay and moisture, the coating of the sand grains with a film of bond and the development of the maximum plasticity of the clay by mulling.

The test figures of Table I illustrate the difference in bond strength developed by the two different methods of mixing the same sand. The standard test procedure of the American Foundrymen's Association was followed.

The conclusion to be drawn from the data in Table I is that, for a given bond strength required for a certain class of casting, less bond and moisture are required if the sand is mulled than if it is prepared in a paddle type of mixer. This lower bond and moisture content not only results in lower sand costs but also in better surfaced castings, lower cleaning costs and scrap losses due to sand defects.

Many other laboratory and shop tests have been made over a period

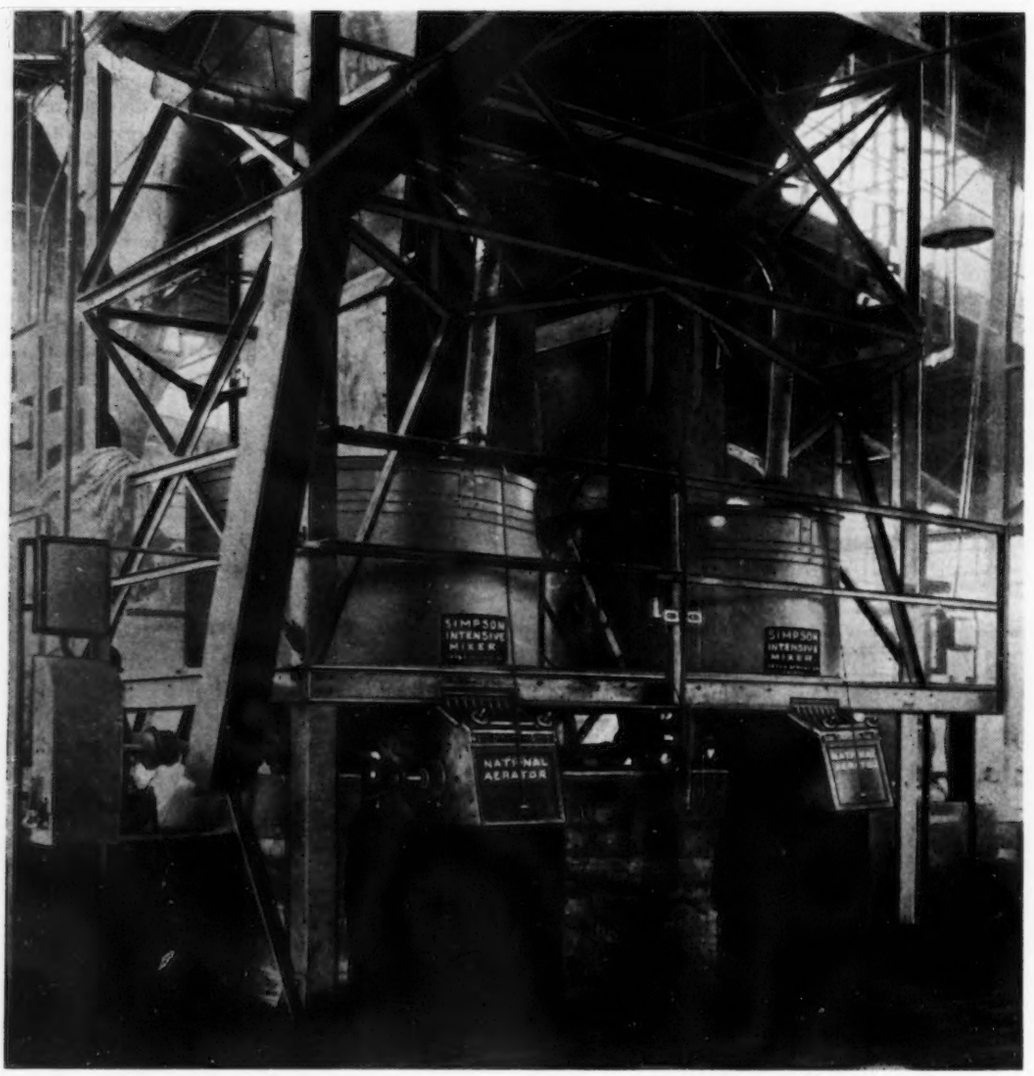


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FIG. 4—External view of a unit used in gray iron, malleable and steel foundries for reclaiming, conditioning and controlling sands.

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FIG. 5 — Diagrammatic sketch of the sand reclaiming, conditioning and control unit shown in Fig. 4.

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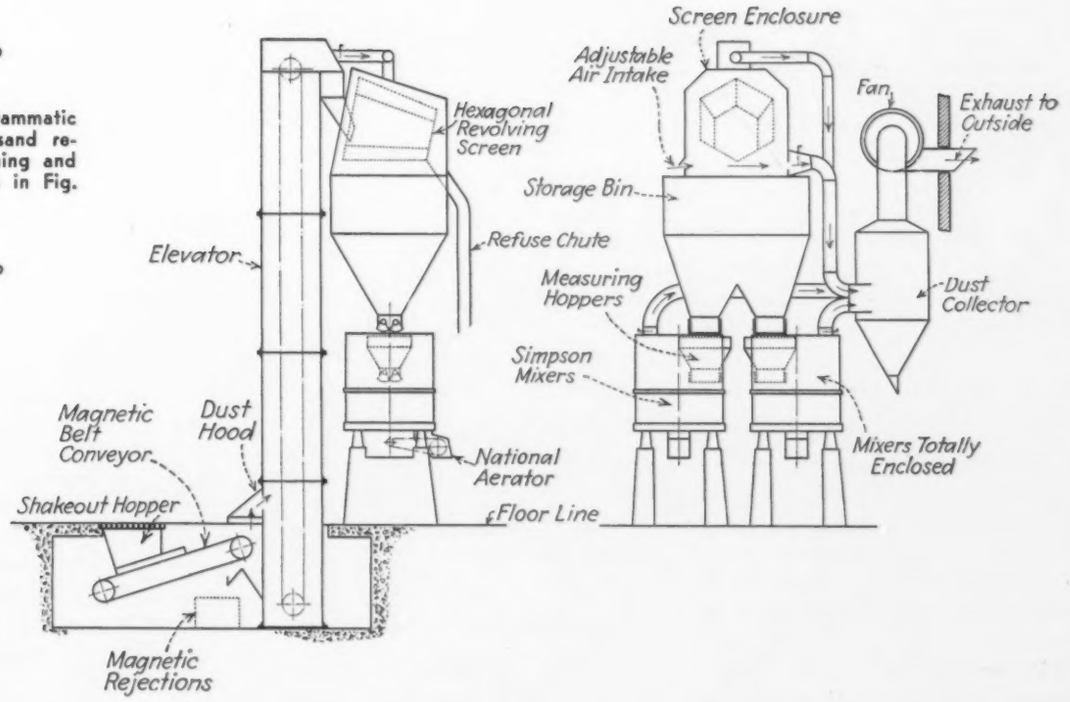

of years to demonstrate that by preparing sand in the batch type muller it is possible to obtain the highest degree of control of the sand, minimum use of new sand or bond and moisture for workability, and thus obtain a clean smooth-surfaced casting with low scrap loss due to sand defects and low cleaning costs.

Before going further, it is pertinent to state that proper sand conditioning and control will not correct inherent defects in casting design, methods of molding, pouring, gating or the metal itself. But the sand into which the metal is poured is one of the most important variables which daily affects the production of high quality castings. That is, after design, pattern equipment, etc., have been developed properly.

Inert Fines:

The fourth variable listed is "inert fines." Each time metal is cast in sand a certain amount of clay or bond is dehydrated or partially dehydrated, some of the sea-coal, etc., burned to ash, and some of the silica grains fractured. This fine material is inert, has no bonding quality and decreases permeability and causes rough, dirty castings with excessive burning on of the sand. In some cases these fines actually show a false strength for the sand which, when metal is poured, cause washes and scabs on the casting. A typical check for this condition is shown in Table II.

Sand No. 1 in Table II had the fines partially removed before conditioning, and, when the casting

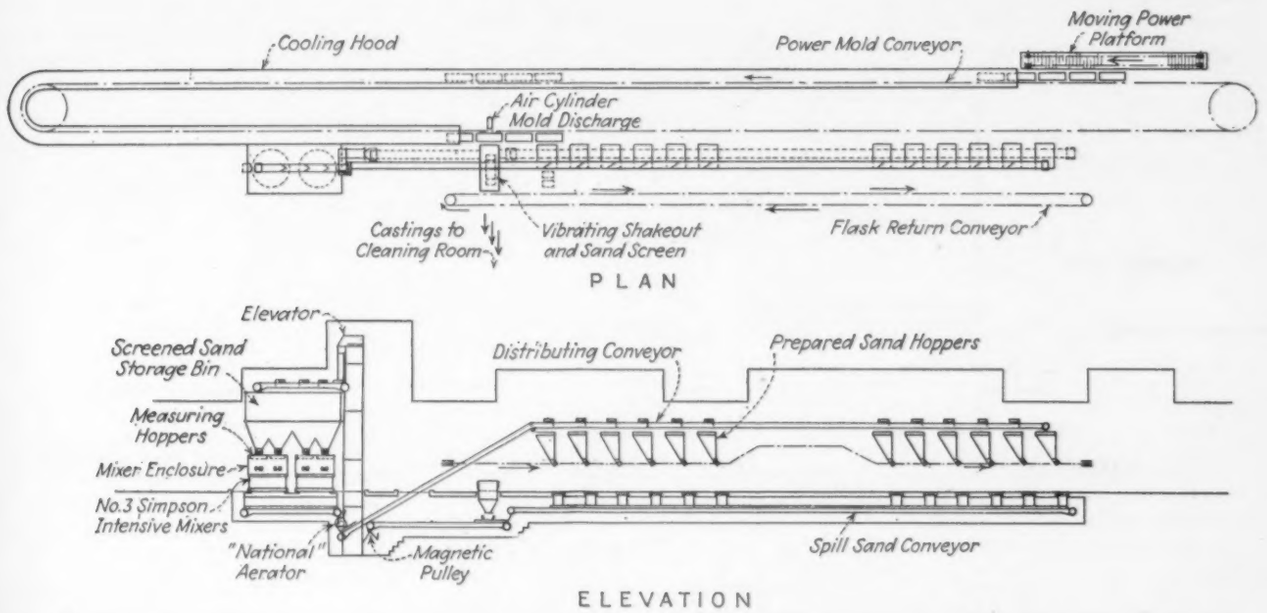

FIG. 6—Plan and elevation sketches of a continuous sand handling system using batch type mullers for sand preparation.

TABLE I

Comparative Bond Strength of Sand Mixed in Paddle Unit and in Muller

TEST NO. 1

A.F.A. test sand used, having 10 per cent of clay and 5.0 to 5.2 per cent of moisture

	Muller Four Minutes	Paddle Mixer Seven Minutes
Mixing time		
Green compression strength	5.6 lb. per sq. in.	3.7 lb. per sq. in.
Dry compression strength	79.0 lb. per sq. in.	42.0 lb. per sq. in.

TEST NO. 2

Burned foundry heap sand used, having 5.0 to 5.2 per cent of moisture

	Muller Four Minutes	Paddle Mixer Seven Minutes
Mixing time		
Green compression strength	6.5 lb. per sq. in.	3.5 lb. per sq. in.
Dry compression strength	55.0 lb. per sq. in.	35.0 lb. per sq. in.

was poured, it was sound and clean. Sand No. 2 had no fines removed, and, when the castings were poured, scabs and "washes" were found.

The removal and control of the amount of fines will aid greatly in controlling permeability. Tests have proved that the removal of 2 to 3 per cent of "fines" from a given sand will result in a much larger increase in permeability than the addition of 30 per cent new coarse silica sand. A recent test illustrated that 15 per cent addition of coarse silica sand caused no increase in permeability.

Functions of Sand Reclamation

The up-to-date modern sand reclamation, reconditioning and control unit provides for the four following factors:

TABLE II

Difference Between Sands With All Fines Present and With Fines Partially Removed

	Sand No. 1	Sand No. 2
Permeability	93	84
Green bond strength (comp.) lb. per sq. in.	6.4	6.4
Dry bond strength (comp.) lb. per sq. in.	45	45
Moisture content in per cent	5.4	5.8

1. Cleaning and screening the sand to remove metallic and other refuse.

2. Reconditioning or re-bonding the used sand in the batch type muller so that a minimum of new sand or bond and moisture is required for workability.

3. Properly aerating the sand after it has been conditioned in the muller. The aeration after proper conditioning increases the flowability of the sand and thus helps in obtaining smooth surfaced castings with sharp edges and maintained closely to tolerances and weight allowances.

4. Complete housing and air exhaust of the equipment handling the shakeout sand with damper control on the exhaust outlets in order to control closely the amount of inert fines in the sand. This not only allows simple control of permeability without excess additions of new sand but also eliminates the dust hazard surrounding the equipment.

Figs. 4 and 5 illustrate a typical sand reclamation, reconditioning and control unit used in many steel, malleable and gray iron foundries for the preparation of facing sands, rebonding additions to heap sands and reclaiming sand formerly discarded as refuse. It will be noted that the unit consists of a shakeout grate at floor level into which the used sand is charged. By means of a belt conveyor the sand is carried over a magnetic pulley to remove metallic refuse

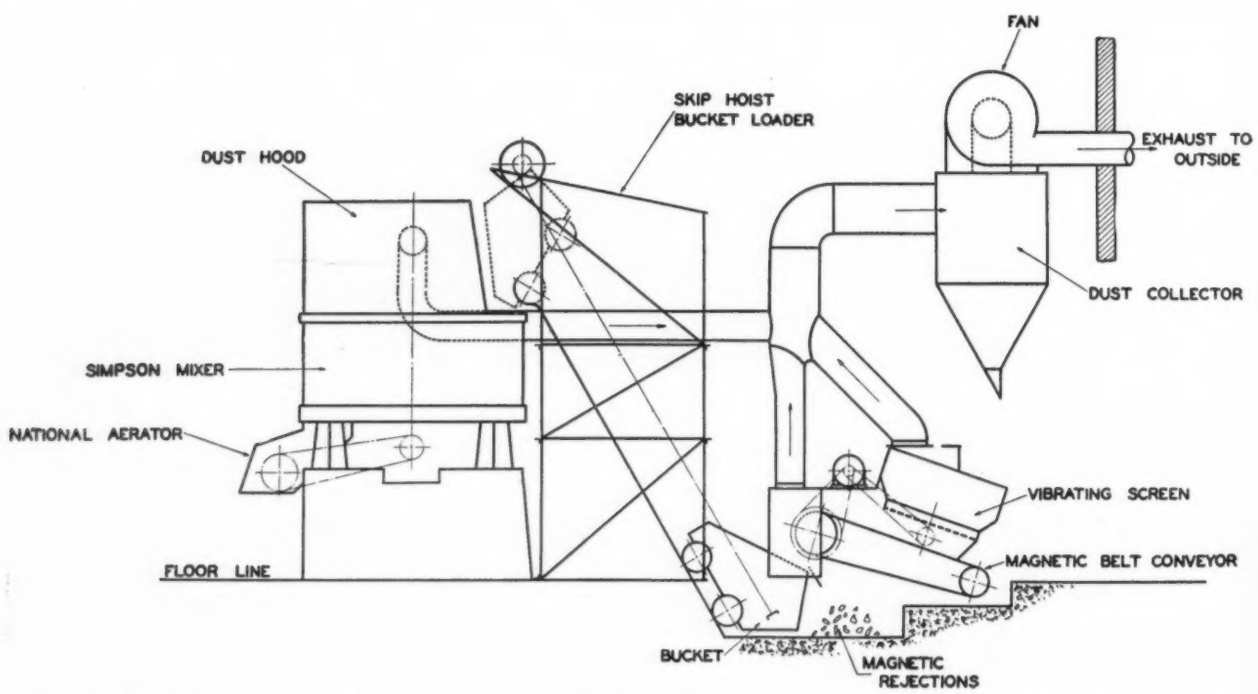

FIG. 7—Diagrammatic sketch of a simple sand reclaiming, conditioning and control unit used in small shops producing gray iron, malleable, steel and non-ferrous castings.

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FIG. 8—Outside view of the sand reclaiming, conditioning and control unit shown diagrammatically in Fig. 7.

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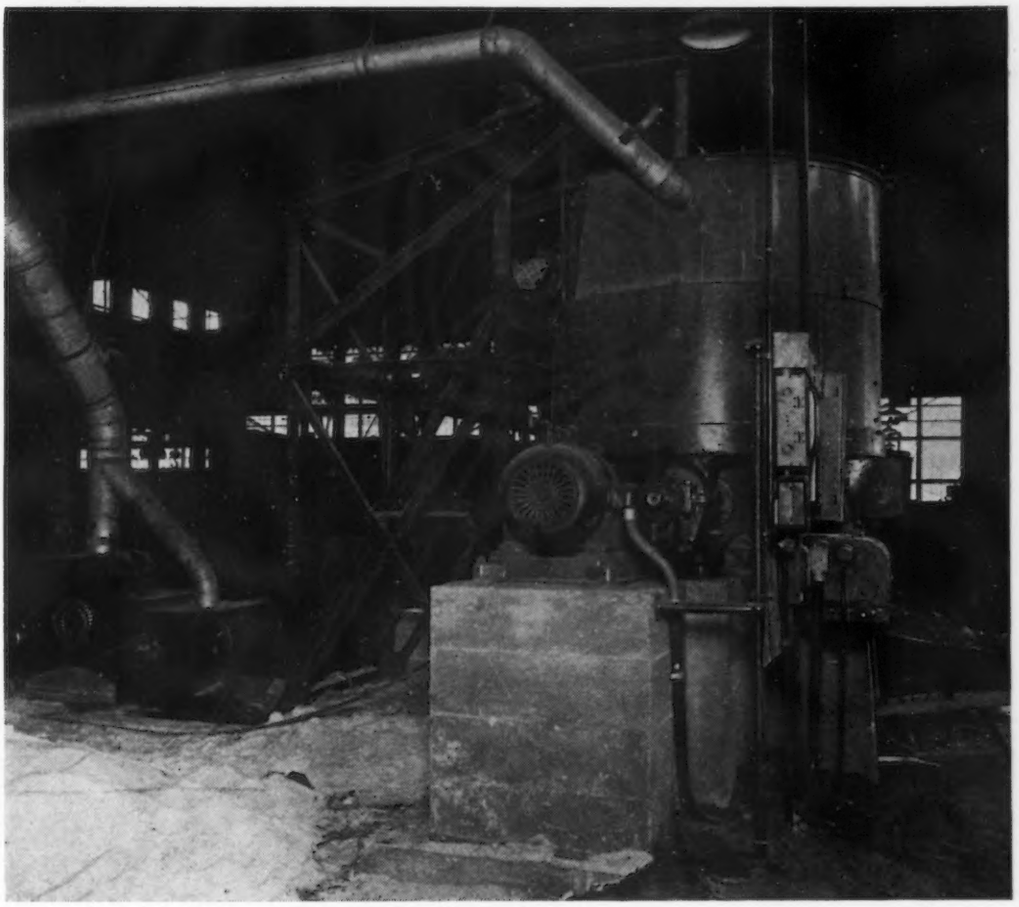


and the sand charged into the elevator and thence to a revolving hexagonal screen where core butts and other refuse is removed. The cleaned and screened sand is charged into the storage bin located over batch measuring hoppers located above batch type mullers. Aerators are mounted on the discharge ends of the mixers to aerate the sand automatically as it discharges from the mixers into boxes for transportation to the molders floors.

The unit is hooded, housed and exhausted with dampers in each of the exhaust outlets to control the amount of fines removed.

All additions of new sand, bond, moisture, seacoal, cereal binder, etc., are made in the mixer so that each batch of sand may, within limits, be as desired. A minimum amount of new sand or bond is required and maximum uniformity and control is obtained.

An analysis of savings effected by such a unit in operation in a malleable foundry pouring approximately 100 tons per day is shown in Table III.

The unit was installed in December, 1934, and put into operation Jan. 1, 1935. The tabulation discloses that the saving in sand costs paid for the unit in eight months of operation. The improvement in quality of product, reduction in cleaning costs and scrap losses were additional profits available.

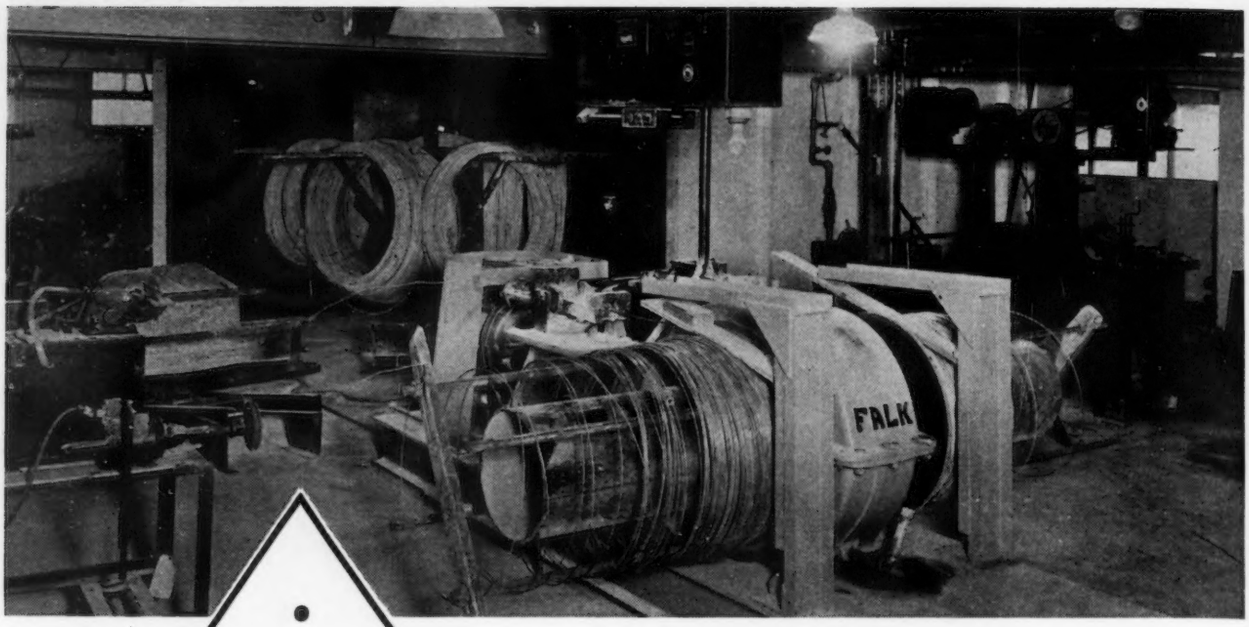
Steel foundries which are not equipped to reclaim their used sand report that they require from 1800 lb. to 2500 lb. of new silica sand per ton of good castings produced. Several steel foundries using equipment similar to that shown in Fig. 4 report that their new silica sand consumption is approximately 450 lb. to 800 lb. per ton of good castings produced. In addition, it is reported that they require 50 per cent less clay or bentonite, have lower cleaning costs (from 10 to 25 per cent and obtain a better surface on their castings with virtual elimination of pin holes and penetration of the metal into the surface of the mold. They are able to maintain permeability within a

(CONTINUED ON PAGE 119)

TABLE III

Cost Savings When a Sand Reclaiming, Conditioning and Control Unit Is Used

	January, 1934 through June, 1934	January, 1935 through June, 1935	January, 1935 through June, 1935 Approx. Saving
New sand consumption	2500 tons @ $4 per ton	250 tons @ $4 per ton	$9000
Clay bond consumption	0	300 tons @ $3.50 per ton	$1050 "loss"
Disposal cost (used sand)	2500 tons @ $0.40 per ton	250 tons @ $0.40 per ton	$ 900
Labor (sand)	6 men	2 or 3 men	3 or 4 men
Scrap loss	Reported decrease (approx.)	25 per cent.	
Cleaning costs	Reported decrease (approx.)	25 per cent.	



STAINLESS steel welding rod is reduced to welding wire sizes in the automatically controlled drawing block shown in the foreground. After liming between passes, the coils of wire are hung on the drying rack in the rear and subsequently pass to reels from which the wire is again fed into the drawing block.

EVOLUTION OF A WELDING ROD

o o o

Cleveland Maker Draws Wire in Specially Designed Blocks and Anneals by Electrical Resistance, While Workers Are Beguiled With Radio Music

o o o

By F. L. PRENTISS
Cleveland Editor, The Iron Age

PRODUCTION methods in the manufacture of welding wire have progressed with the greater output that has resulted from the increased demands of the arc welding industry. Not only have economies been effected in making the electrodes, but the quality of the product has been materially improved.

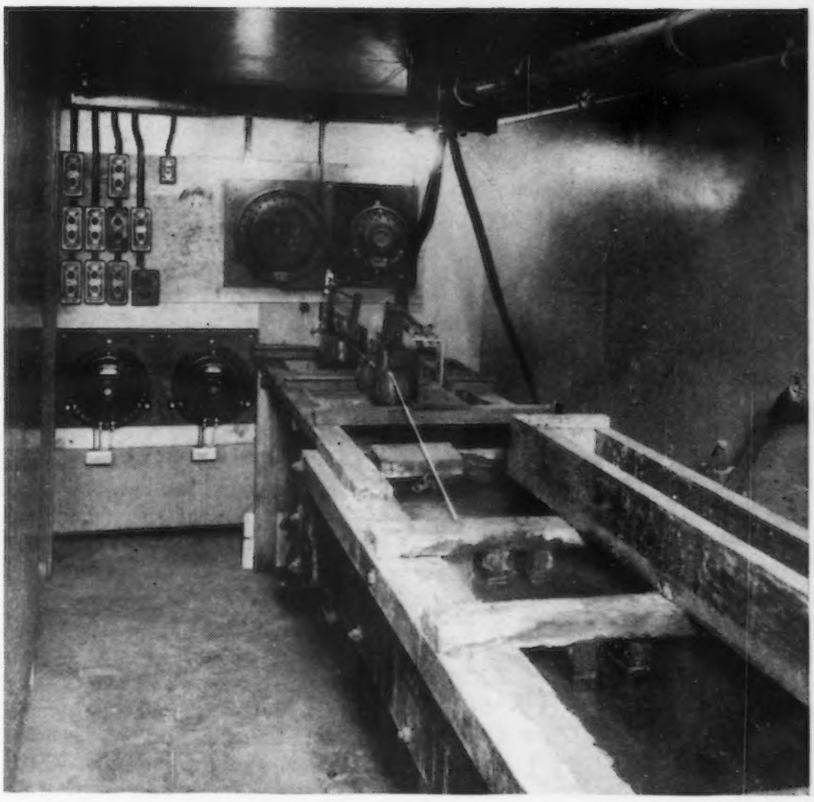
Specializing in this field, Maurath, Inc., Cleveland, makes only alloy welding wire, producing it in 16 analyses for joining corrosion and heat resisting and stainless steel products. These electrodes are made in sizes from 5/64 in. to 3/16 in. in diameter.

With much of its equipment specially designed and automatic in operation, both the plant arrangements and the methods followed in the Maurath plant for processing welding wire to produce a high quality product are highly interesting. As the quality of the electrodes is improved by processing the wire in controlled atmosphere, both the coating room and the drying room are air-conditioned to maintain uniformity both of temperature and of humidity. By means of the air-conditioning equipment any condition both as to

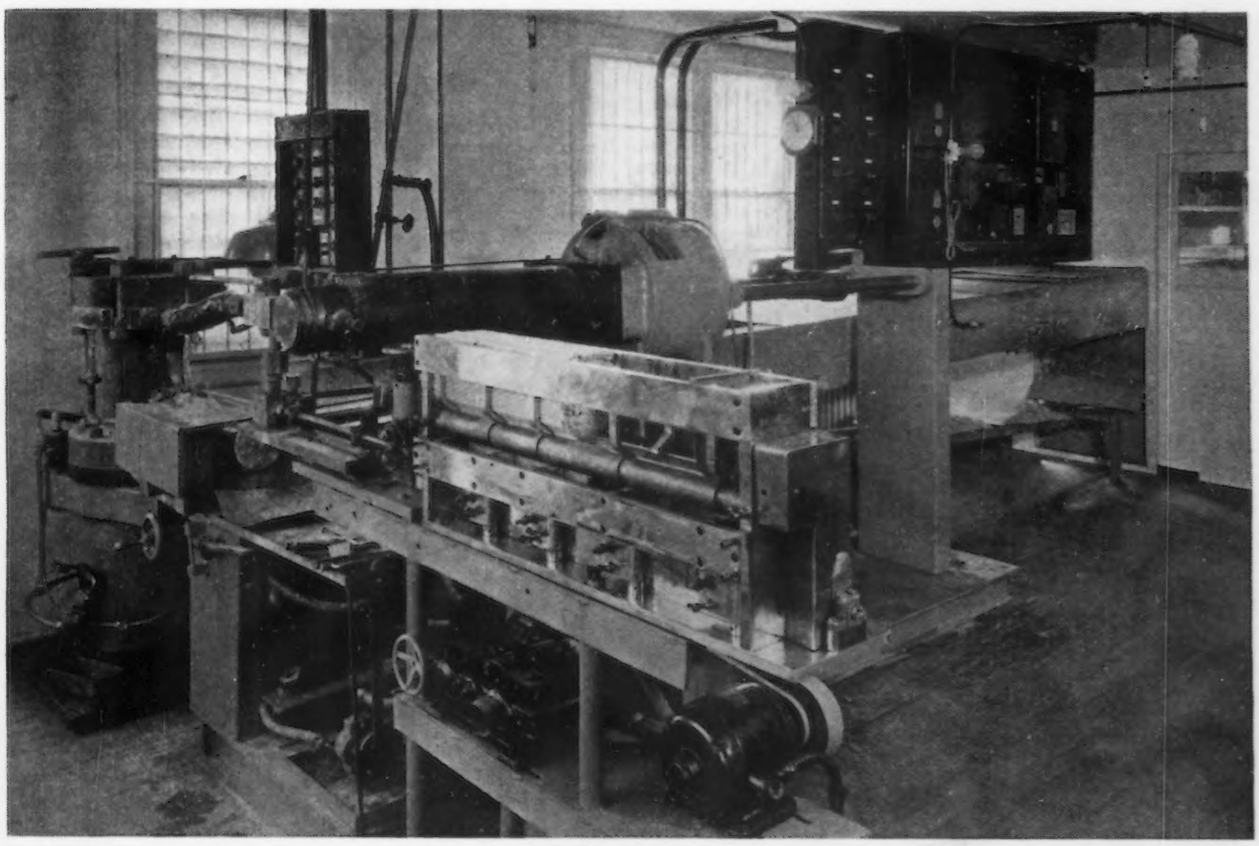
temperature and humidity may be obtained and kept uniform. Working conditions for the men also are made more comfortable, particularly in extremely hot weather.

An unique feature of the plant is that radio entertainment is provided for the employees while at work. There is a master receiving set which is connected to six loud speakers located along the walls throughout the plant. Music, sports, political ballyhoo and news of the day add to the contentment of the workers, and the radio entertainment is said to promote rather than interfere with their efficiency. The employees have their own dining room which is also served by the radio during the noon hour.

Hot-rolled alloy steel welding rods, all ¼ in. in diameter, reach the plant in coils ranging in weight from 35 lb. to 250 lb. These are increased to 700 lb. coils by welding the ends of separate coils together. The use of larger coils saves 8 in. of rod in pointing for successive drawing operations. Not only is there a saving in scrap by the use of large coils, but labor is



WIRE is annealed by being heated by direct resistance, both a.c. and d.c. current being used, the former for preheating and the latter for the final high temperature. This picture shows the wire passing through the roller type electrodes and entering the continuous pickling tank at red heat. A take-up reel at the end of the unit draws the wire through the electrodes and pickling tank.



COATING is applied to the wire in a machine that is fully automatic. The coating material after being mixed is placed in the loading cylinder at the left and from this is transferred to a screw-operated extruding cylinder that is located in a horizontal position above the machine. Wires are fed from the hopper at the right, and, after coating, are discharged onto a belt conveyor through the housing shown at the rear into the adjoining drying room.

conserved as the pointing, starting and handling operations have been considerably reduced in number.

The rod is drawn into wire in a "side-wheeler" double drawing block, the reels being horizontal instead of in the usual vertical position. The wire is reduced 0.50 in. in the first pass through the drawing dies, or from approximately 0.220 to 0.170 in. in diameter. The number of passes ranges from one to seven, depending on the analysis and size of the finished electrode.

The drawing block is of a special design that was built in the Maurath plant It is electrically controlled and automatically stops if the wire breaks, if the coil becomes snarled and when the coil is finished. By using the large coils, the machine is practically self attended. Annealing of the alloy wire is necessary after each pass through the drawing block to reduce the hardness produced by cold working.

An unique method has been adopted for annealing the wire electrically. The wire is heated during its continuous movement through the annealing unit by passing electric current through it, both a.c. and d.c. being used in the annealing process. Wire is first preheated to 1300 deg. F. by passing it between rollers that are electrodes for high-amperage alternating current, and it then passes between another set of rollers supplied with direct current, which heats the wire to 2000 deg. F. From the latter rollers the wire at bright red heat moves into the pickling tank. The d.c. current also serves the pickling tank. With duplicate equipment for annealing, two strands of wire may be annealed at one time. The speed of annealing is 20 to 60 ft. per min., depending on the size of the wire.

The pickling tank is 20 ft. long. A non-acid solution is used in the tank for removing the scale and it also acts as a quenching medium for softening the austenitic steel by cooling.

The wire fed from a reel is drawn through the annealing equipment and pickling tank by variable speed collapsible takeup reels. On leaving the pickling tank it passes under a spray of water for cleaning before being wound on the reels.

The power plant for the annealing and pickling equipment consists of two 600-amp., General Electric d.c. arc welding motor generator sets and one 300-amp. Wilson motor generator welding set. Two transformers are provided for supplying low-voltage a.c. current for heating the wires. There is also a 5-kw., 250-volt motor generator set that supplies direct current for operating contactors that control the high-amperage current and the motor driven take-up reels.

On removal from the take-up reels, the coils are hung on a crane and dipped into a tank on the floor level containing cleaning solution to remove all smudge and is then dipped into a lime solution to make it ready for the next pass through the drawing machine.

After liming, the coil is lifted from the crane onto a drying rack consisting of a vertical shaft and six arms. After being hung on one of the arms the rack is revolved a short distance on its axis to bring the coil in close proximity to the wire drawing block.

Wire is straightened and cut to length after drawing to size on two high-speed straightening machines of special design. These machines have eight-die rotary straightening arbors instead of the usual five-die arbors. The arbors have a variable speed drive, advantages of which are said to be close adjustment and more accurate straightening. The arbor has a speed of 5000 r.p.m The straightening machines were built by the Lewis Machine Co.

The wire is cut to standard 18-in. lengths, and is then ground on a specially designed machine in order to remove the drawing compound, foreign matter and fins left on the ends after cutting to length.

(CONTINUED ON PAGE 120)

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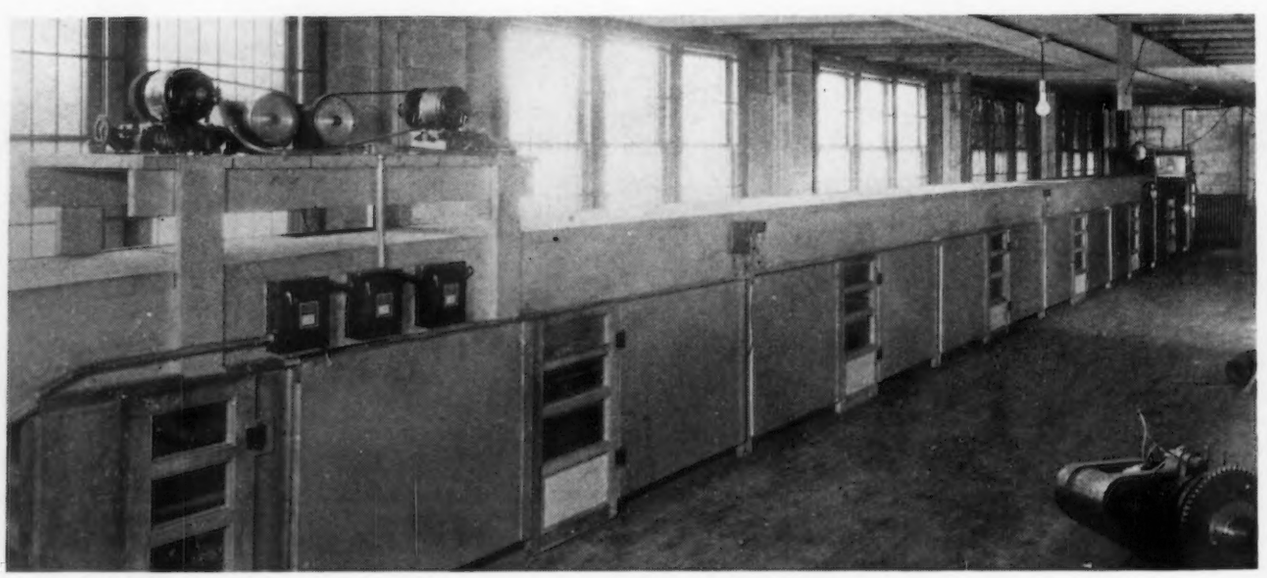
THE coating room conveyor delivers the wire to a conveyor that serves the drying oven shown in this picture. The drying room is air conditioned. The wire makes two complete circuits through the drying oven, the oven conveyor permitting eight reductions in speed from the time the wire enters until it leaves the oven.



THESE NEW SOVIET OPEN-HEARTH DEPARTMENTS

1. Planned Work and Discipline

° ° °

By RALPH VAILL
Azov Steel, Mariupol, Ukrainia, U.S.S.R.

° ° °

TO Americans, the term "planned economy" is a political abstraction. A vague, nebulous ideal. But, in the Soviet Union, as I can bear witness, after four years service as an open-hearth operator, this business of "planning" is no laughing matter. It is the daily concern not only of the director of the plant and the superintendent of a department, but it governs the first helper at his furnace, the ladleman with his ladles, and the brick mason who repairs the furnaces. The "plan" for us steelmakers comes down direct from G.U.M.P or, to you, from the head office of the metallurgical industry, a section of the People's Commissariat of Heavy Industry. The planning bureau of our plant, on receipt of the "plan," from G.U.M.P. then prepares a local plan for each department. On receipt of these rectified plans, which are a monthly occurrence, the director of the plant generally calls a meeting (Sobranya) of heads of all operating departments, supply, finace, personnel, etc., and after the usual review of successes or failures as regards last month's plan goes into this question of meeting the new plan that is "before the house." And by the way, these, as well as most of the many (Sobranyas) that are held, are night affairs, lasting often until eleven or twelve o'clock. The accepted plan, and they are always accepted, then becomes the operating law of the plant. Materials, men, and transportation are given in accordance with this plan. Delays, repairs, shutdowns and schedules are arranged so that this plan can be realized. And realized it must be. For the "big boss" Ordjonikidze, will accept excuses for costs, for labor turnover, for accidents and casualties. But if you peruse Russian papers, *La Industrialization* in particular, you will see that he removes men, big and little for one reason—failure to "meet the plan."

That thread, "the plan" is both the warp and woof, and the color and texture of the cloth in this man's land. It is the steam in the boiler that has raised the speed of daily production from a rate of 13,000 tons a day in the dark winter of 1932-33 to the present 45,000-ton days. Not only does the plant have this monthly plan, but

each department has its daily plan, and each turn its shift plan. It forms the psychology of the actual worker. A first helper, for example, does not worry about whether he has a "tough heat" to make, or whether his "buddy" left him a weak bottom. Oh no! He has a plan for his work during the shift. At a certain hour he must have the heat melted, at a certain hour he must have the heat tapped. And those "planned" times are in the forefront of his consciousness. The very operation of changing shifts is principally one of getting all gears into that one mesh called for by the "plan." A roof falls in and the "plan is shot" for that day.

The "Changing of the Guard"

The change of shift is almost as serious a performance in a Soviet open-hearth shop as mounting guard at Buckingham. True, we don't have the music. But in other ways it's a pretty good show. And a serious one to all concerned. Does the shift foreman come into the "charging floor shanty" plunk his feet down on the nearest desk and talk to his relief about the baseball scores on the news board as he passed through the city? Not here. Rather he comes to the shop one good full hour ahead of time. Goes over every section of the plant. Notes condition of all current work. How many ladles ready. How many sets of molds. How many charges prepared. Gets accurate knowledge of condition of every furnace. Then goes to an office and prepares "the plans" for all his people. They in the meanwhile have inspected their own particular jobs. And 10 min. before time to "take over" the whole shift assembles in groups, in various places, for the 5 min. "pep" meeting that precedes each shift. Some of the "get out and die for Siwash" talks that are given at these meetings would make a football coach go out and study oratory. From this they go forth to "accept" their furnaces, ladles, etc., and begin the shift work. The late, and the new shifts inspect in company. And minutely too. And what scandals arise! Frequently, high authority must be called in to arbitrate. For, if one says a heat is "melted," and the other says "T'isn't" then how else can the question be decided? It is vital. According to plan, Ivan should have melted the heat. For successfully completing that process he would get, say, 10 per cent of the total pay for the heat. If Pavel allows that the heat is melted, then it is up to him to tap in a definite time thereafter. This shouting and tumult dies away, only to grow again when the shift that has been relieved goes to make the report. All of the work of the shift is here reviewed by the superintendent of the shop, or one of his assistants. Why was the plan not fulfilled in this, in that? Fines and reprimands, and premiums are awarded with gusto. Lengthy reports are entered into journals. Of course, no one ever reads them. There are so confounded many. New orders (prekazes) are made out. This takes an hour, never less. Hence a shift is really 10 hr.

Mountains of Mute Evidence

Believe me, it is difficult for an American to reconcile himself to this way of working, even though its tremendous value in such a new enterprise, as is this, is evident. Much damage does result. The backyard of any new, big, Soviet plant has a mountain of mute evidence to this effect. Evidence that graphically tells the story of heat and toil, hardship, feverish work and fierce despair that has been the portion of these beginners. But I know of no other system whereby they could have progressed so greatly as they have in these past four years. And furthermore it is not fair to mention these backyards without some comment on the front yards. For an interesting duality exists. The contrast is startling. In these front yards we have, alongside blast furnaces and open hearths, intensively cultivated parks, with fountains, statues, trees, flowers, benches and all. Here at Azov Steel, we have a "bureau of beautification," which tends these parks, cleans streets, sidewalks, floor spaces and building exteriors. It is staffed mostly with peasant girls wearing a gay uniform of beret, blue coat and grey skirt. Match that!

Back in the glamorous days of '31, when the full import of this new Soviet industrialization began to dawn on us, those of us engaged here used to have great arguments as to how people's noses could be kept to the industrial grindstone without the "money incentive"—the "accumulation of private property" as we capitalistic fellows customarily regarded it. Generally we agreed that "It couldn't be done." But the discipline obtaining in these plants today completely refutes us. There is very little absenteeism. Practically none in the higher categories. The director of the plant, or the superintendent of a department are respected leaders just as they are in America. Direct or willful disobedience of an order is unheard of. Even though vodka is the most plentiful thing in the land, and obtainable everywhere in every store, yet a good "whiskey breath" is a very rare thing in the plant. Weighty books of instruction are given to all workers. No one dreams of flouting these instructions. Fines and reprimands are dealt out with startling harshness. But against this premiums are awarded just as prodigally. For complete fulfillment of plan high pay is possible. For overfulfillment, as much as five times base pay is possible. All cyclical operations, for example, are divided into logical periods. In charging, fettling, melting, and refining a heat of steel the first helper and his helpers are paid so much for each operation. True, this requires bookkeeping. In Stalinsk, for 1500 workers we had 200 "pencil pushers." For special occasions the superintendent of the shop has a fund to play with. If a roof falls in, he can summon the bricklayers and offer them a bonus for comple-

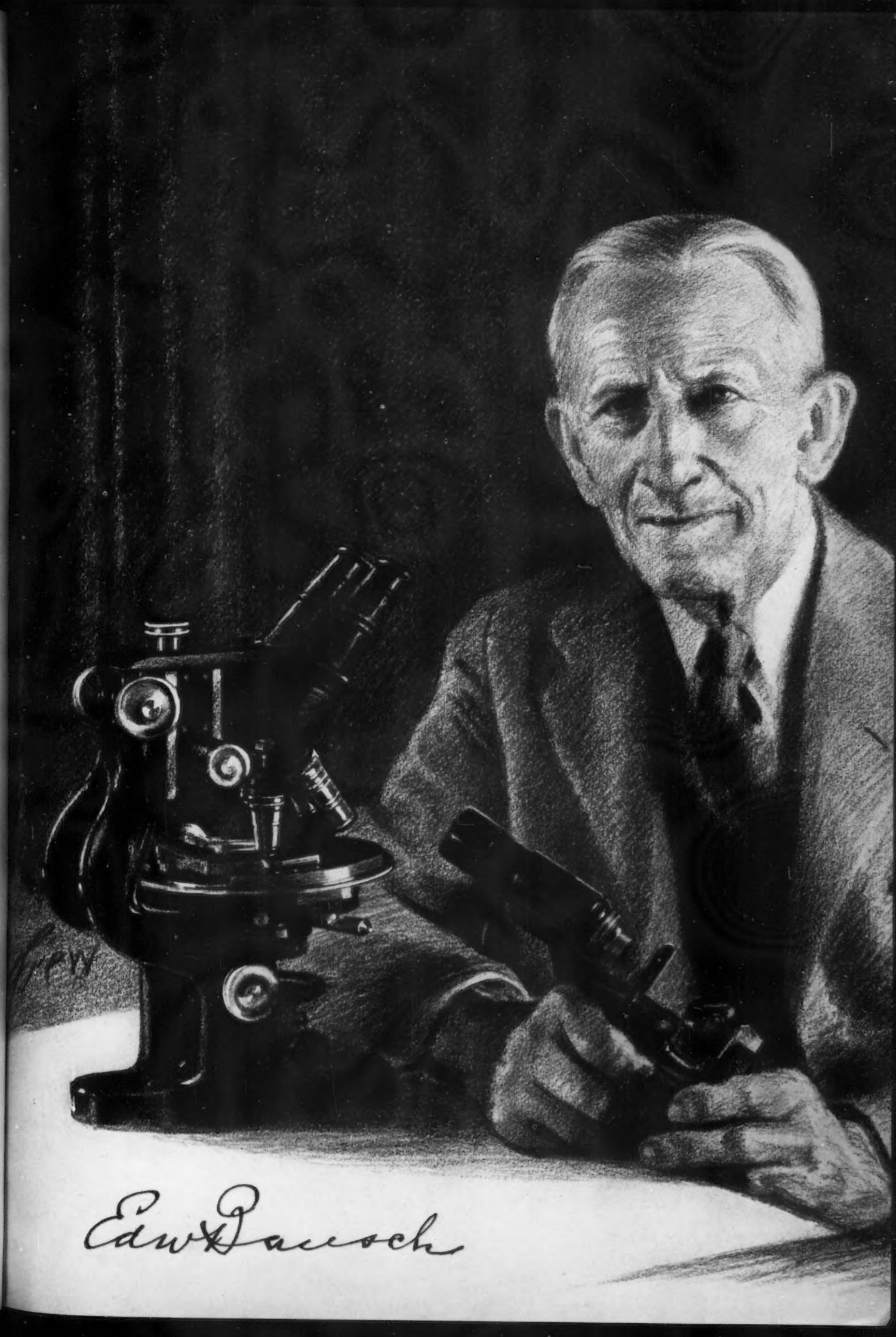
(CONTINUED ON PAGE 121)

DR. EDWARD BAUSCH

ON Dec. 1, Dr. Edward Bausch, who is portrayed on the opposite page, will receive the medal of the American Society of Mechanical Engineers for distinguished public service.

Dr. Bausch has been active in the optical industry since 1874. In addition to his great accomplishment in reducing the cost to the public of microscopes and other high-grade precision optical instruments through improvements in manufacturing methods, he has been one of the world's leading pioneers in the advancement of optical science.

Today, at the age of 83, he is still on the job every day, working with his associates in the solution of difficult problems.


Edw Bausch

A NEW SOAKING PIT

By H. F. SPENCER and
C. F. HERINGTON

A LARGE Pittsburgh steel producer has installed and is now using a new type of soaking pit made by the Amsler-Morton Co. This description of the furnace shows that it has a number of desirable characteristics, namely, simplicity, adaptability to any type of fuel, low fuel consumption by means of re-circulating gas flow, recuperator design, automatic firing and a highly efficient cover. Two tables are included which show fuel consumption on both hot and cold heats and comparative data on the making of bottom in the Amco unit and in the pit-type soaker.

WITH the development of ingot steel and the subsequent rolling of that steel, the importance of equalizing the temperature of the entire ingot body before rolling was realized. It then became necessary to develop a furnace or pit in which the steel ingots could literally "soak" in a heat which would impart a uniform temperature and softness for rolling.

The first devices employed were actually simple soaking pits, in which no extra fuel was applied and a true soak obtained. However, as production conditions were variable, the ingots generally arrived at the soaking pits too long after pouring to contain sufficient sensible heat to yield a true and satisfactory soak. The form of the soaking pit was gradually changed so that it became a heating furnace as well as a soaking pit. Fuel saving features such as regenerators and recuperators became essential parts.

It can be seen at once that such an operation opens the way for various methods and experiments, in operating and with different fuels, the correct use of preheated air, regulation of furnace atmosphere, etc. As a result, there is generally found in the steel industry today no definite trend for the improvement, use and operation of soaking pits. Too frequently a mill has failed to solve certain rolling problems because the effect of the soaking pit on steel quality was ignored.

Experience has taught that the ideal soaking pit should have or impart to the steel the following characteristics:

1. Extreme simplicity.

2. Adaptibility to any fuel or fuel mixture and minimum consumption thereof.

3. An effective, durable and inexpensive recuperator.

4. Elimination of the destruction of the original scale (washing).

5. Automatic control of operation and temperature with positive uniform heating.

6. Continuous firing with furnace atmosphere control.

7. Uniform grain structure.

Such a soaking pit would inevitably result in important economies, in a superior finished product and in increased production. Seeking a solution for the ideal pit, engineers of the Amsler-Morton Co., Pittsburgh, have placed in operation and patented both a distinctly new type soaking pit and a new type recuperator. The characteristics of the ideal pit described above are said to have been achieved in actual practice, together with economies assuring a quick rate of amortization. The pit and recuperator are marketed under the name Amco.

In describing the construction and operation of these new units, the relation to the ideal characteristics already listed will be pointed out, omitting (3) for detailed description later.

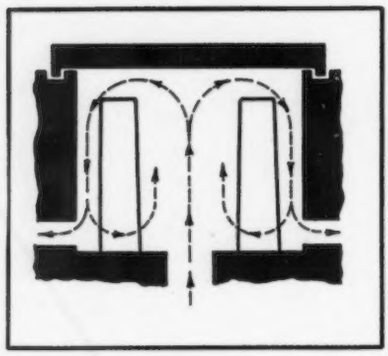


FIG. 1—The gas flow in the Amco soaking pit is such as to produce a turbulent, fountain-like envelope surrounding the ingots.

The Amco soaking pit will use any common industrial fuel including blast furnace gas or mixed gas. This soaking pit does not deviate from the correct basic principle of heat applied parallel to the long axis of the stock. The flame enters the combustion chamber as a natural convection current through a port in the hearth, and the ingots which surround the port are not directly in the path of the flame. The velocity of the gas as applied at extremely low pressure increases rapidly after release in the pit and (see Fig. 1) produces a turbulent, fountain-like envelope completely surrounding the ingots. Induction re-circulates a part of the comparatively cooler gases in the furnace and a true soaking condition is attained. Waste gases are removed through spaced outlets located near the corners of the side walls slightly above the coke braize. The gases from each outlet pass into the recuperator thence to the stack. It should be mentioned here that if producer gas is used the port is provided with a dual controlled supply system so that fuel may be supplied continuously from one of the two lines while the other is being burned out. The actual fuel consumption per ton of steel heated is exceedingly low, to the writers' knowledge the lowest that has ever been attained in soaking pit operation. Known fuel rates on 18 in. x 21 in. Bessemer ingots averaging 45 min. in the mold are 200,000 B.t.u. per gross ton on 12-ingot (37 gross tons) charges. On full charges of 12 cold ingots, the rate is 1,400,000 B.t.u. per gross ton.

Features contributing to this low fuel consumption is to be found in the incorporation of every known means of obtaining economy in furnace design. The walls of the pit

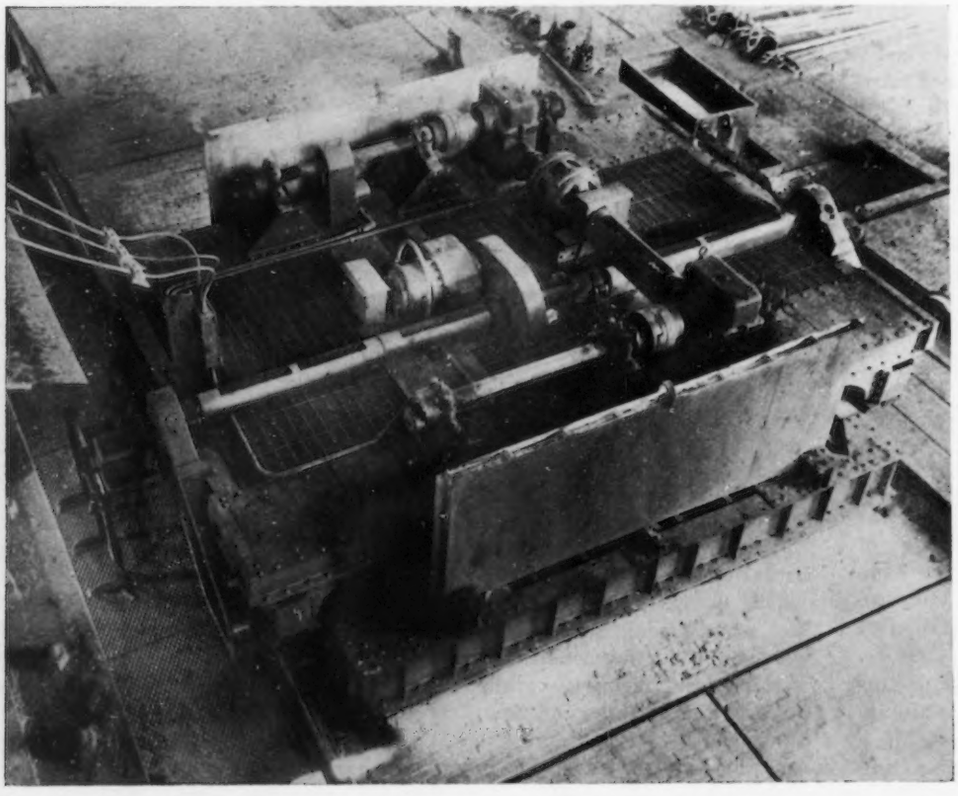


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FIG. 2—This seal-type cover lifts and traverses from closed to full opening in either direction.

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are cambered to provide stability particularly to the cover seal which rides the walls. An important factor in fuel economy and even in maintaining lasting effectiveness of the furnace and the automatic fuel controls is a specially designed Amco seal type cover. This is a flat, refractory arch, moving vertically in relation to a carriage which in turn moves on a level notchless track. A ganister seal engages the edge of the cover. A single master switch controls the movements of the carriage and cover, it synchronizes fuel, air supply, and draft, in succession, to avoid heavy heat losses during charging and discharging, thereby saving fuel. A photo of this seal-type cover is shown in Fig. 2.

Elimination of Washing

Complete retention of the original scale formed upon the ingots during heating has always been the objective of soaking pit operation. However, heretofore, localized overheating and melting has too frequently resulted in "washing" or the destruction of this scale to some degree.

In regenerative pits this washing was minimized by means of alternating the periods of heating and soaking. This system though, is often not conducive to economical or good heating results and generally requires considerable skillful manipulation of the dampers by an experienced heater. In spite of this, due to the impingement of flame, the ingots in front of the firing ports are usually washed. Washing results in the metallurgical reaction called incipient fusion due to the loss of the protective scale coat.

Incipient fusion is best described as the leaching of intergranular deposits of metallic compounds, metalloids, and alloying elements from the crystal aggregates composing the true surface of the ingot. Because these elements have a low fusion point, they are attacked by the high temperature of the flame when unprotected by the iron-oxide scale. Now the results effected by controlling the heating of the ingot is proving to be highly important. Washed points or spots vary the structure and surface of

FIG. 3 — Section through Amco air flow recuperator. This design is said to increase the heating surface 25 per cent in the same space occupied by the average recuperator and requires about 40 per cent of the weight.

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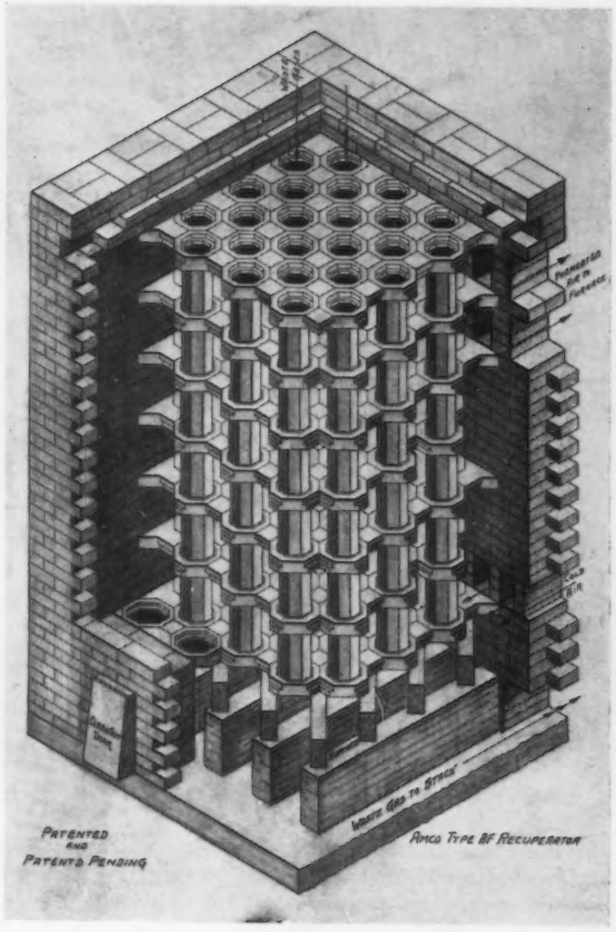
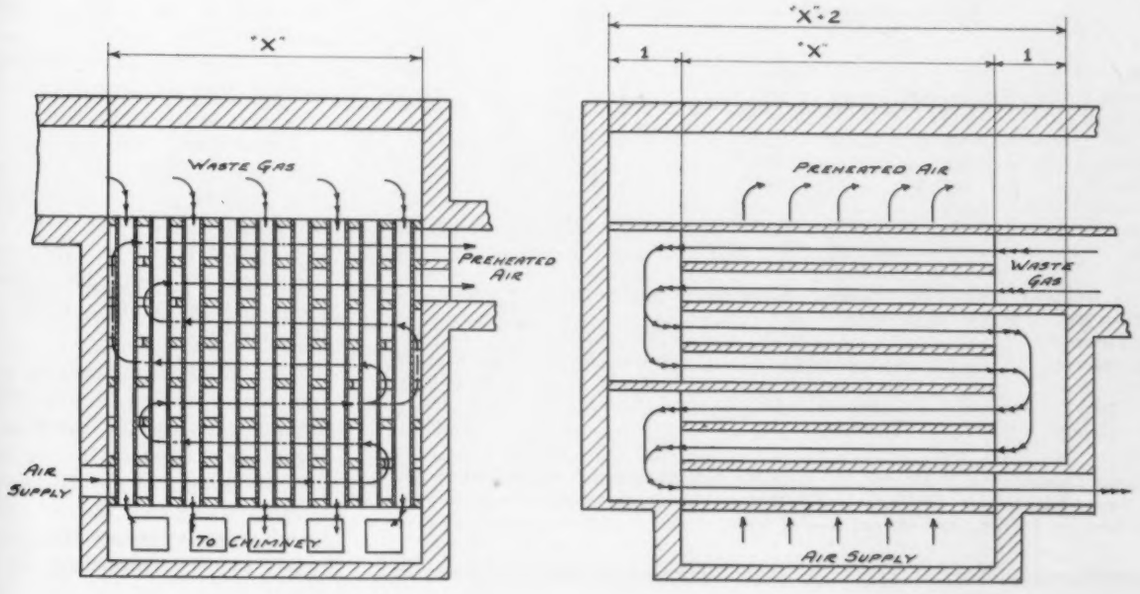
BELOW

FIG. 4—(Left) — Cross-section of Amco air flow recuperator showing flow of gases downward through tubes, and air horizontally and upward around tubes, inside of the recuperator structure proper. There is no wasted space at sides. (Right) Obsolete design of usual recuperator wherein the waste gas enters the recuperator through the side to destructively localize heat, and reverses direction outside recuperator proper.





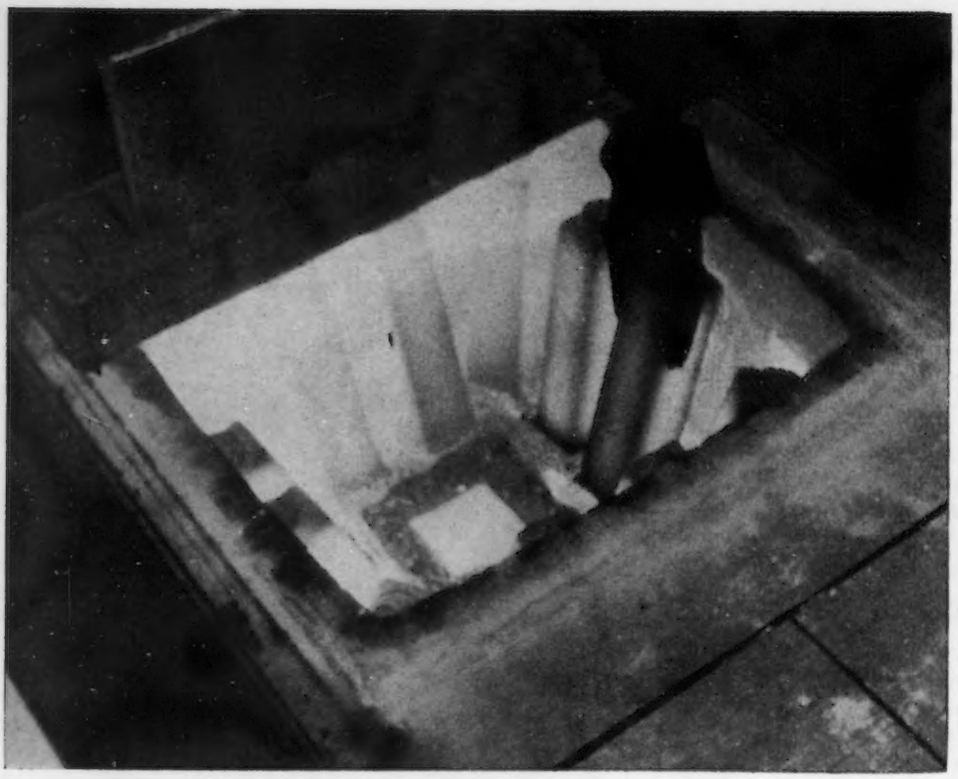


FIG. 5—Placing the twelfth ingot into an Amco soaking pit. Note the heated condition of the previously placed ingots.

the ingot and result in defects in the finished product. Even a small washed corner on an ingot will cover considerable area after final elongation in the finishing mills.

Another serious difficulty brought about by washing is the resultant high iron-bearing scale which is deposited upon the hearth. This deposit is fluxed by the coke braize and is exceedingly difficult to keep out of the checker chambers. It reacts with the refractories of the pit and shortens the life of the lining. It also forms a slag which adheres to the brick work. In order to remove this it is necessary to take the pit out of production and this results in the loss of a great part of the heat in the brickwork together with effective heating time.

In actual operation the Amco pit has proved that when firing continuously throughout the entire cycle there is no washing of the steel. Consequently all the difficulties just described are eliminated. A small amount of slag forms on the hearth, but this deposit, comparatively, is very mild. A week of operation of a 37-ton pit produces only some 200 lb. of cinder containing about 22 per cent iron. This is very loose and may be removed with no difficulty or delay.

Although the importance and possible benefits of absolute and automatic temperature control within the soaking pit have long been understood, their achievement in complicated reversing furnaces has been slow and in many cases imperfect. In a large number of cases ingot rolling temperatures are judged only by the practiced eye of the pit operator. In view of the fact that there is a narrow range of rolling temperatures for various chemical analyses such a method is unquestionably crude and undependable. The Amco pit handles this problem with a temperature control system consisting of thermocouples in the four waste gas outlets wired in parallel to a potentiometer controller which in turn operates a valve in the fuel lines.

The initial firing rate is set by the heater in accordance with a schedule set up for the time the ingots have been in the molds before stripping. A throttling range setting on the controller is selected which starts to reduce the fuel flow prior to the recording by the

TABLE I

Fuel Requirements in an Amco Soaking Pit

Steel Charged, Gross Tons	Temperature Deg. F.	B.t.u. Required per Gross Ton	Coal Equivalent per Gross Ton, in Pounds	Gas Used per Gross Ton, in Cubic Feet
185	Cold	1,555,000	140.5	1,495
5,217	1700	223,400	20.1	214
5,402	Hot and Cold	269,000	24.3	258

Natural gas figured at 1040 B.t.u. per cu. ft. Coal at 13,500 × 0.82 = 11,100 B.t.u. per lb.

* * * * *

The data given below were obtained from one full week of continuous operation of the pit, from May 17 to May 23 inclusive.

Temperature of Steel Charged, Deg. F.	B.t.u. Required per Gross Ton	Coal Equivalent per Gross Ton, in Pounds	Gas Used per Gross Ton, in Cubic Feet
1700	202,000	18.2	194
Cold (2 Heats)	1,460,000	132.0	1,400

Control temperature = 220 deg. (in waste gas outlet); estimated temperature in pit = 2450 deg.; preheated air temperature = 1200 deg.; waste gas temperature at bottom of recuperator = 700 deg.; and average time of ingots in pits = 2 hr.

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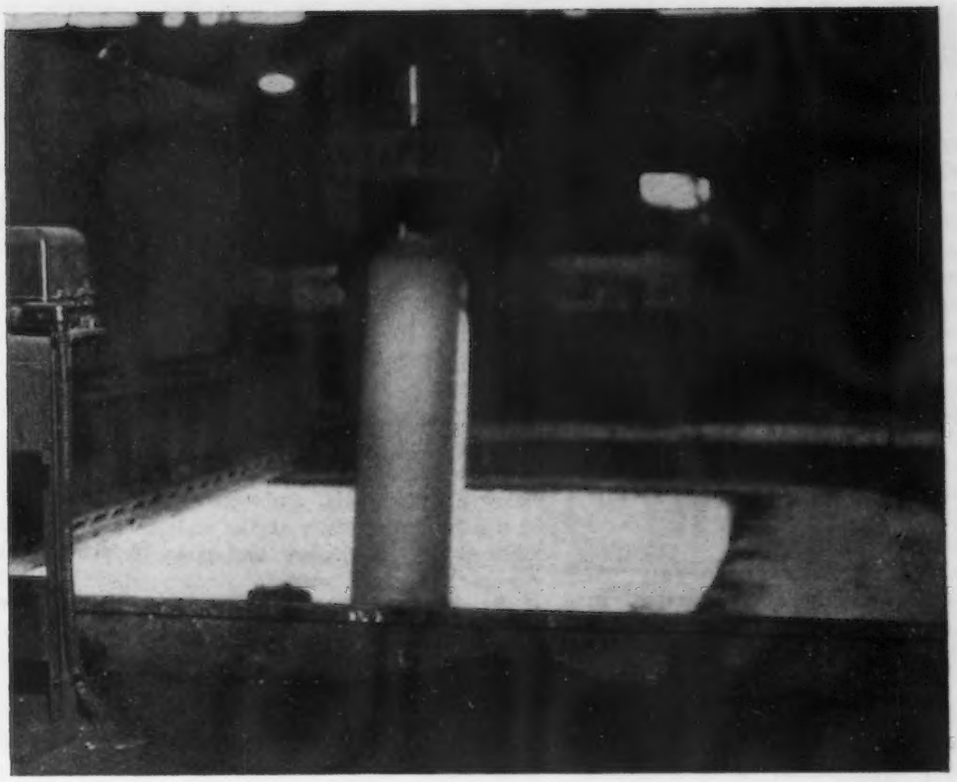

FIG. 6—Placing the second ingot. Note the arcuate stabilized wall.

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thermocouples of the control temperature at which the soaking period is to begin. The controller then continues to reduce the fuel during the soaking period until the steel is completely soaked, the thermal input becoming constant to supply stack and radiation loss. The fuel flow meter thus records the completion of the soaking period by showing the leveling off of the rate of fuel flow which has become constant.

Thus is achieved the vital uniformity of controlled automatic heating which is so important for successful and perfect rolling. This method eliminates any necessity for skill. It does away with unequal elongation and curling of the steel in the mill and the accompanying grain structure variation. The rollers are much better able to adjust the screw-downs for each pass, and with each ingot requiring approximately the same screw-downs, mill efficiency is immediately increased. There is also no further danger of roll breakage by cold ingot butts to cause expensive mill shut-downs.

In order to provide continuous firing and high efficiency of the pit it was necessary to devise methods of automatic combustion and internal pressure control. With these, atmosphere and scale control can be secured, giving the pit complete adaptability to all types of steel ingots.

An orifice, for imparting a measure of fuel flow to a diaphragm regulator, operating a butterfly valve, by means of a piston, in the intake line of a low pressure fan, to provide combustion control. The low pressure fan provides positive but variable flow and insures an air supply through the recuperator for fast starting when the tiles are cool at the beginning of operations. The air flow is measured by means of an orifice in the fan inlet ahead of the butterfly valve and is indicated upon a flow meter. Hand knob adjustments may be made to the air ratio regulator. The ratio equipment automatically changes the flame from luminous to clear as the heating cycle reaches the soaking period. Experience has proved this to be a highly desirable improvement in steel heating.

As a means of controlling pressure two sampling tubes are placed opposite each other 15 in. below the curb blocks in the side walls of the pit. These furnish static pressure impulses to the diaphragm regulator which operates a butterfly damper in the stack by means of a piston. The pit can be

(CONTINUED ON PAGE 130)

TABLE II

Comparative Data on Making Bottom

During the week, May 17 to 23 inclusive, the following comparative data on bottom making between the Amco pit (1 hole, 12 ingots) and three holes of old-style pits (4 ingots per hole) were observed:

	Amco Pit	Old-Style Pit
Number of bottoms replaced per hole	1	8
Total bottoms for 12 ingots	1	24
Number of coke additions	1	None
Amount of coke per bottom, in pounds	5,850	1,125
Amount of coke per addition, in pounds	4,050	None
Total coke required for 12 ingots, in pounds	9,900	27,000
Amount of cinder and slag removed, in pounds	6,484	13,800
Amount of metallic bearing slag recovered, in pounds	184	2,700
Metallic content of recovered slag, in per cent	22.33	60
Amount of coke returned to pits, in pounds	4,950	11,100
Per cent of coke recovered	50	40
Time required for making bottoms, in hours	2	24
Time required for making one addition, in minutes	40	..
Labor for making bottoms, in hours	13½	76

FOUR open hearth furnaces, nine soaking pits, and a blooming mill are among Inland Steel Co.'s new construction developments which amplify steel service from its Indiana Harbor plant. Each 125-ton furnace is thoroughly insulated and each unit is equipped with a central instrument and control panel whereby operating conditions are under observation at all times. The combination oil and gas-fired soaking pits are closely controlled by automatic instruments, the result being that in combination with effective top sand seals air in the building is unusually clear. The new bloomer, which is equipped with 43-in. by 100-in. rolls, is designed with electrically driven and controlled manipulators located in front of and behind the roll housing.

Extension of the No. 2 open hearth building (which formerly housed 15 units) provides for the four open hearth furnaces and a mixing pit which is served by a standard gage track and Pugh mixers from which hot metal is poured into ladles for distribution by overhead cranes to the furnaces.

The new units are constructed in line with the old furnaces, and on 80-ft. centers, a condition necessitated by adherence to the previous building design. Bath depth is 33 in. and each hearth measures 16 ft. wide by 43 ft. long, providing an area of 623 sq. ft., which is equivalent to 4.15 sq. ft. per ton of steel produced.

Furnace bottom supports are placed so that a section 5 ft. on both sides of the tap hole is depressed 5 in., thereby affording desired depth of bath, extra brick below the tap hole, and economy in depth of magnesite at the ends. Chill boxes are shallow and truss design has given way to girders with webs consisting of plates separated by spacers with openings for air cooling. The bottom consists first of insulating brick and then successive layers of fire-brick, chrome brick, chrome plastic, and magnesite.

Roofs are formed of 16-in. silica bricks except above the tap hole, where 22½ in. bricks are used. Insulation consists of 1 in. thermo flake coating overlaying 2 in. of thermo flake granules. Slabs cut and welded form buckstays which support the sides, ends and sloping backwall. Fire-brick paneled doors, designed with water cooled frames and mullions, are operated by push button controls. Oil burners, which may be raised and lowered, are inserted in a water-cooled, welded-steel plate housing which is located in the center wall between the uptakes.

Slag pocket side and end walls which are fully insulated, are laid up with 18 in. of silica and clay brick and the floor consists of 9½ in. of clay brick. Gas flowing from the slag pockets to the regenerators passes beneath a flat suspended arch which also extends over the regenerator. Uniform spread of gas under this arch is expected to give better heat distribution in the regenerator. A water cooled nose arch is located at the slag pocket end of the throat which connects the slag pocket and the regenerator.

The new regenerators measure 20 ft. 3 in. by 24 ft. 9 in. in length

NINE circular soaking pits serve the new 46-in. slabbing mill. o o o

and width by 18 ft. 6 in. from floor to top of checkers. The suspended flat arch roof is 12 in. thick, side walls are 22½ in. thick and the floor is 4½ in. thick. All exterior surfaces are adequately insulated.

Installed opposite each furnace is a superheater, a waste heat boiler and a motor-driven induced draft fan. Ordinarily waste gas will be drawn through the boiler, but a by-pass direct to the individual stack is provided and will be used in event of interruption of service of either the superheater or the boiler. Water-cooled sliding dampers control the flow and direction of waste gas. Each fire-tube boiler contains 464 2½-in. tubes and the fan is rated at 45,000 cu. ft. per min. The stack measures 6 ft. in diameter by 165 ft. high and it is lined with 6-in. blocks.

Fuel oil is heated to 180 deg. F. and is circulated up to the control panel. A single oil line extends from the panel to the furnace burners, where an electrically operated, remote-controlled valve is used to cut off or start the burner at time of reversal. Automatic draft control holds 0.04 in. water

INLAND EXPANDS INDIANA HARBOR PLANT

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By ROGERS A. FISKE
Western Editor, The Iron Age

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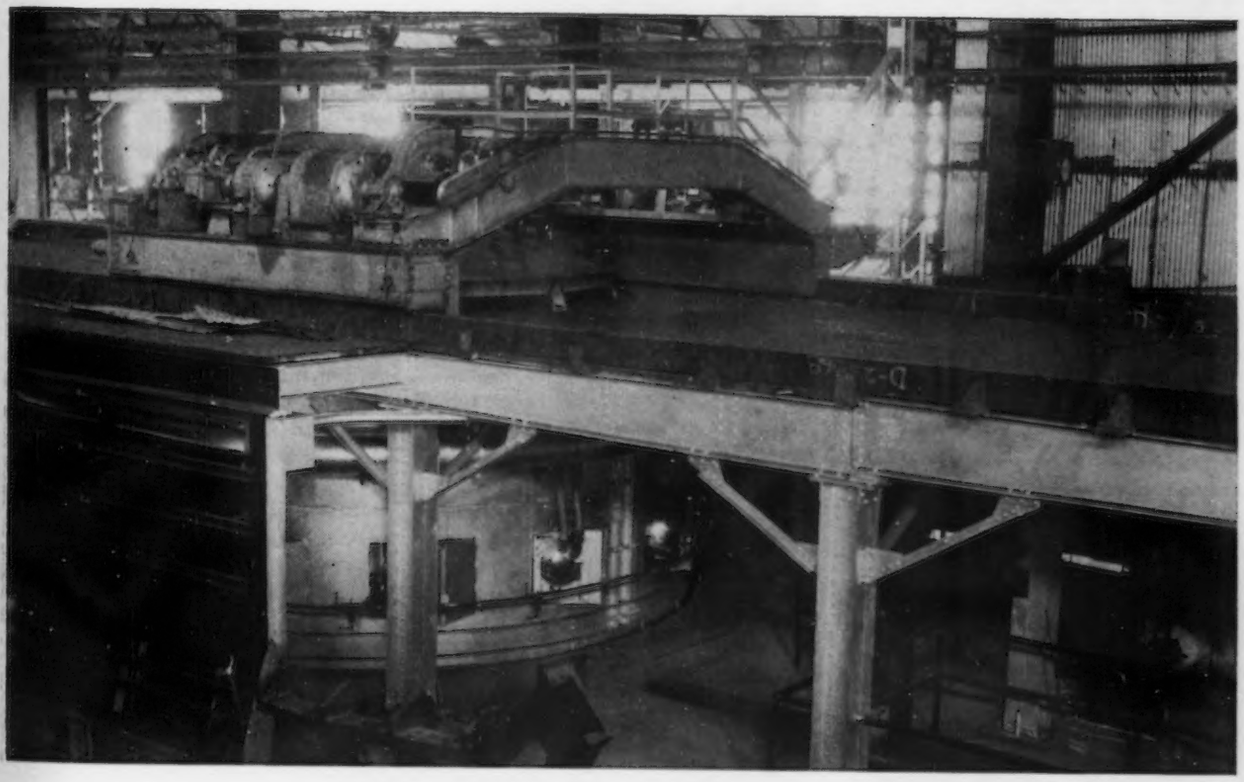

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THE fifteen combination oil and gas burners are set at an angle of 38 deg. thereby imparting a whirl to the flame and gas.

pressure in the open hearth combustion chamber. Provisions have been made to burn tar and gas, should occasion demand.

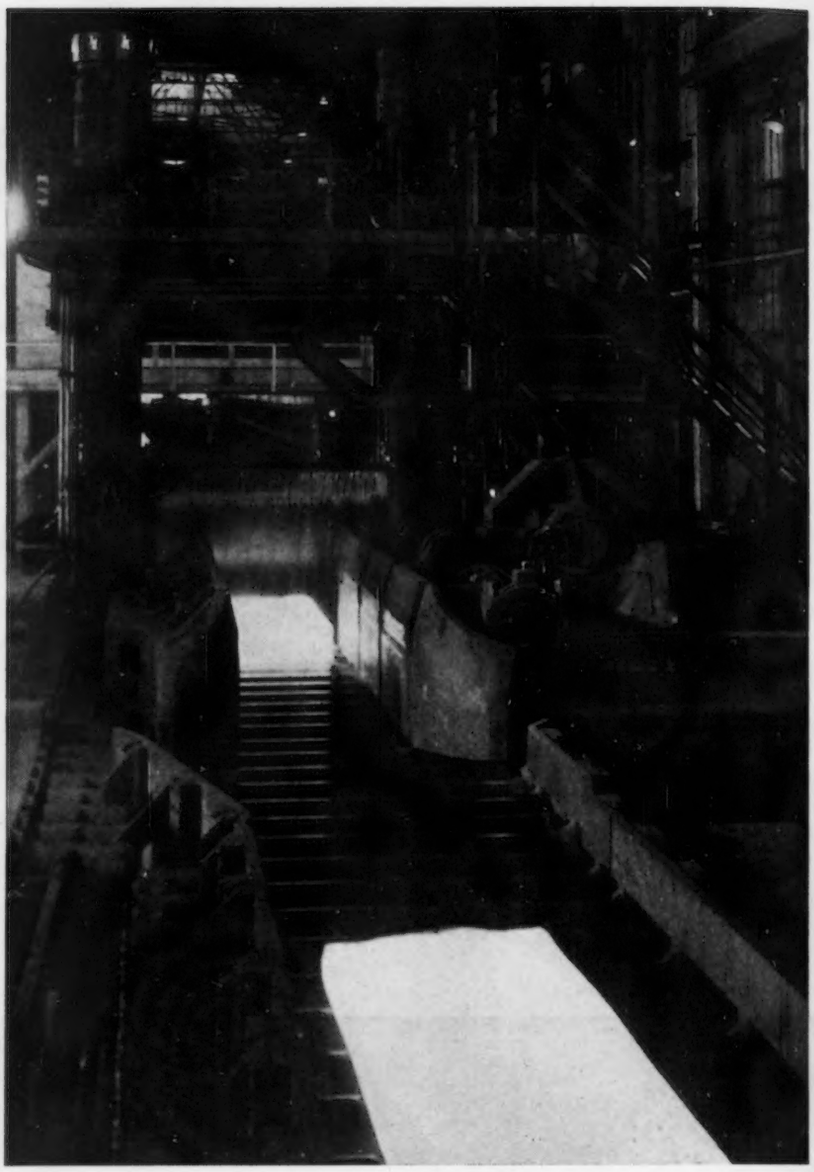
Flow of oil, manually set by the operator by means of micrometer valves, is indicated and recorded at the control panel, on which also is mounted an indicator operated from an air-flow meter. Checker temperatures also are recorded. Reversals are by electrical control so synchronized that as one set of valves opens the other set closes.

Adjacent to the extension of the No. 2 open hearth structure is a new stripper building, 62 ft. by 140 ft. It is served by a 200-ton crane which is designed with two towers, one being used for stripping and one for spotting ingots in specially constructed standard-gage cars by means of which ingots are transported to the blooming mills.

The new soaking pit building is an extension to the new blooming mill structure. The nine new pits are laid out in a row, being paralleled by three under-roof standard gage tracks, the two outer ones being used for ingot cars and the inner one for the ingot buggy and trash cars. Two overhead cranes of 80-ft. span are equipped with tongs having 26-ft. lift and auxiliary 25-ton hooks. The tracks are depressed several feet below the lower pitfloor level, which is 11 ft. 1½ in. below the working floor.

Each Salem circular soaking pit measures 16 ft. in diameter at the top 3-ft. section, from the bottom of which the walls slope outward for the next 3 ft., below which they are again vertical, thereby forming a suitable combustion space near the bottom of the pit. Each of the 15 burners is set at an angle of 38 deg., thereby imparting a whirl to the flame and products of combustion which work to the top of the pit, where the gas is directed toward the center and is then started downward to the flue opening, which is in the center and at the bottom of the pit.

Each group of three pits is served by a natural draft steel stack which stands at the end of a main underground flue to which the three pit flues connect. These pits were installed without recuperators, but provision has been made for erection of waste heat boilers, which method of recovering heat appears to offer the best possibilities.



THE 46-in. slabbing mill is equipped with manipulators before and after the rolls. o o o

An ash-car tunnel extends beneath the pits and serves clean-outs at the ends of the cross connecting flues. Refuse is raked into narrow gage cars which are dumped into a pit from which refuse is removed by the main overhead cranes.

Three cover-cranes are designed to travel on rails secured to the working deck. These cranes bridge the pit covers with close margin of clearance and they lift and lower a cover by means of clamps which engage four cover lugs. An operator rides each crane. The pits are circular and therefore it is not necessary to uncover more than one-half the opening at the time of charging or unloading, thereby conserving heat. A pilot wheel, attached to the cover crane, travels on a rail of special contour which changes the elevation of the wheel, thereby making and breaking electrical contacts. Because of this safety feature the operator cannot err as to the proper sequence of moves. At the center line of the pit this rail is formed into a sharp V. When the wheel drops into this V the operator may raise or lower the cover, which is designed to fit into an effective sand seal.

An interesting feature of this installation is that all oil, gas and air lines are of welded construction. The 15 burners on each pit

are of the combination type, so that either oil or coke-oven gas can be burned. At present six pits are gas fired and three are oil fired. Air, from turbo-blowers, as well as gas and oil, are tapped from main lines and pass through goosenecks which surround each pit. Air and gas goosenecks are above the burners and the oil line, with which is wrapped a steam line, is located between the lower floor level and the burners. Connections between goosenecks and burners are made of flexible metallic tubing.

Automatic devices control atmosphere and temperature throughout the heating cycle and provide a graphic record of furnace performance. Ratios of fuel to air are automatically maintained and temperatures are controlled throughout the heat. Furnaces are kept under balanced draft with 1 to 1½ per cent combustibles in the waste gas, a practice which reduces the formation of scale. Each furnace is enclosed in a steel jacket and all openings for burners and other purposes are sealed to provide a nearly airtight structure. This construction, combined with thorough insulation, not only reduces fuel consumption but makes more effective the various control devices.

Preliminary operations have disclosed that each furnace is capable, without forcing, of heating 15 tons of steel per hour. With 26-in. by 54-in. by 70-in. ingots, weighing about 21,000 lb., these furnaces have shown fast heating time and they have shown the advantage that once having had the temperature brought up cold ingots can be successively charged. Eight of the above size ingots constitute a charge for one furnace and the heating time approximates the time lapse from open hearth tap to soaking pit charge. The normal combustion chamber temperature is **2450 deg. F.**

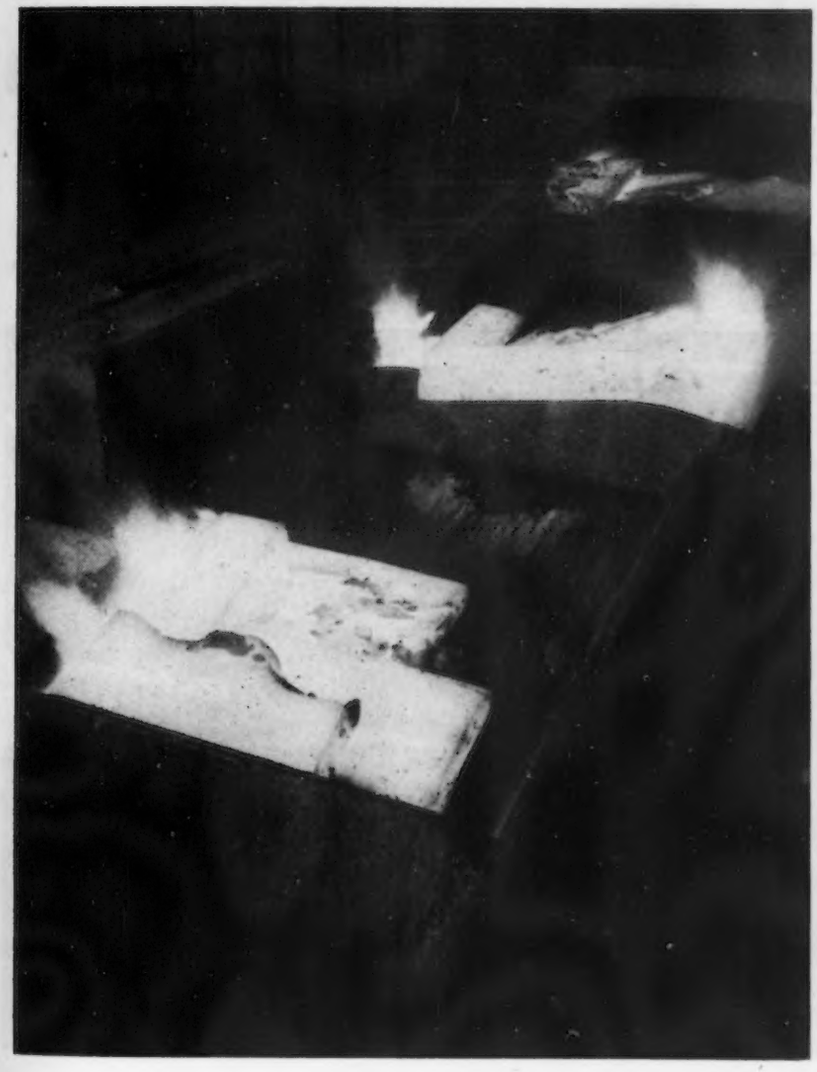
Center line of the 46-in. Mesta bloomer or slabbing mill coincides with the center line of the ingot buggy track. Preceding the front manipulator are 19 18-in. rollers and then follow 18 20-in. rollers. The mill rolls which measure 43 in. in diameter by 100-in. face are of the smooth type and therefore ragging is not encountered. The operating pulpit is located over the approach rolls about midway between the mill housing and the ingot buggy.

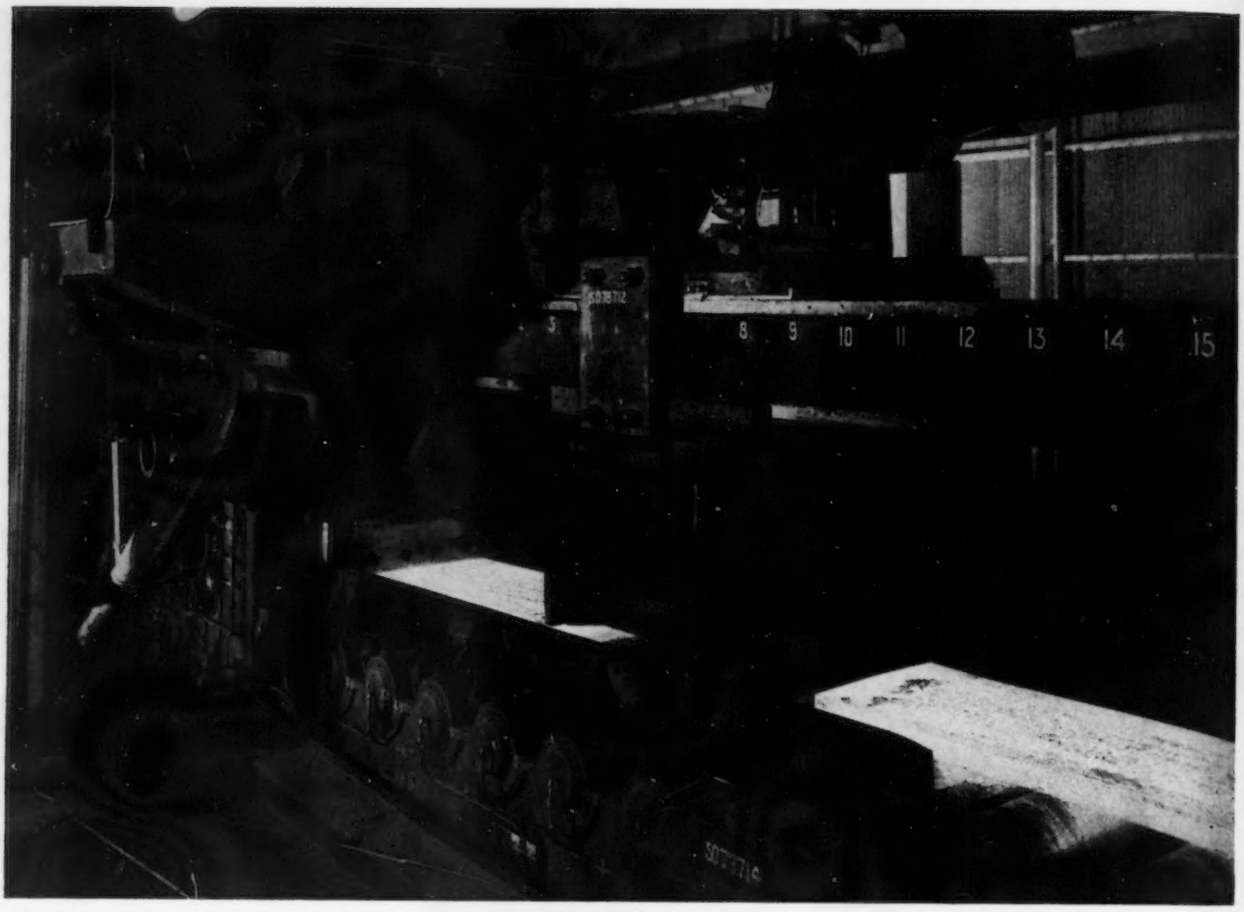
At the rear of the mill is another electrically operated and controlled manipulator so that ingots are spotted and turned before passing in either direction through the mill which is direct driven by a 7000-hp. electric motor. After having been rolled to size the slab travels in a straight line past a gage beam to the Mesta shear. Crops drop to a drag type of conveyor which extends beneath the operating floor and which discharges to a pit outside of the building. The scale is in direct line with the shear.

Slabs move straight away from the scale and pass over rollers which extend across the width of a transfer table which is fed by a pusher. Delivery is made to a cross line of rollers which extend past three pushers and their elevating sorting tables or pilers. Inspection of the slabs is made as they are delivered to the above line of rollers. Overhead cranes with chain slings remove groups of slabs from the various pilers and place the slabs for storage, chipping or scarfing as required. These cranes also serve to charge the gas-fired slab-heating furnaces which feed to a hot strip mill, the center line of which coincides with that of the 46-in. slabbing mill.

All the rollers are fully equipped with roller bearings, whereas the bearings on the 46-in. slabber are made of babbitt-backed bronze. All moving parts throughout this mill are under an automatic pressure greasing system. Water troughs extend the full length of the roller stands and in this manner scale is

o o o CROPS fall to a drag conveyor which terminates over an outdoor pit.





SLABS move in a straight line from the bloomer past the gate beam, shears and scales to a cross conveyor.

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THREE sorting tables, or pilers, aid in slab segregation preparatory to storage, chipping or scarfing.

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washed to pits from which it is removed by buckets hung from the overhead cranes.

The crop pit, which was constructed along the outside of the northwest wall of the slabber building is served by an overhead crane. The pit construction is interesting in that it consists of reinforced concrete walls and floor. A bed of old rails protects the floor. The walls are lined on the inside with steel sheet piling so placed that between the concrete and the piling there remains a space which is filled with crushed slag which acts as a cushion. A ridge in the floor coincides with center line of the crop conveyor. A gate operating on this ridge throws crops to one side or the other so that one side can be emptied by a lift magnet while the other side of the pit is being filled. A row of course water streams cools the crops. These new additions to Inland's mill facilities, and in particular the straight line layout from soaking pits through the hot strip mill, not only give increased steel making capacity but they are important factors as to quality of product and the planning of schedules.

Army Man Discusses Strategic Metals

STRATEGIC materials of the United States were discussed by Col. C. T. Harris, Jr., director of the planning branch, office of the Assistant Secretary of War, in an address before the New York chapter of the American Society for Metals, on Nov. 16. He stated that the United States has been treated especially well by nature, because we have the full requirement of food, power, coal, iron, chemicals, petroleum, copper, lead, sulphur, cotton, zinc, and phosphates. The list of materials that we have not is long, but somewhat less disturbing than those of many of the major foreign powers. It includes manganese, nickel, chromium, tungsten, antimony, tin, rubber, wool, potash, coffee, hides, jute, Manila fiber, sisal, silk, and drugs.

To demonstrate the way in which relief of the scarcity problem has been approached, Colonel Harris discussed in detail a few materials. One that is highly strategic is manganese; it is absolutely necessary in modern steel making, about 14 lb. being used in the production of every ton of steel. The principal sources of ore of the required grade are Russia, India, the Gold Coast of Africa, and Brazil. In time of war, when cost ceases to be the determining factor, it would be possible to stimulate domestic production. It was estimated that in two years of war, domestic production might supply approximately 30 per cent of our requirements, but at very high cost. In any event it would be necessary for us to secure abroad at least 1,000,000 tons of ferro-grade ore, or our steel industry would be seriously handicapped.

This country accounts for approximately one-half of the chromium consumption of the world; in 1929 only 269 tons was produced, whereas the average annual importation of ore for the 1925 to 1929 period was 24,355 tons. Chromium would be a difficult problem in war. Tungsten is used in the making of high-speed steel and domestic production is not sufficient. However, cooperation of Government agencies and industry has developed a bountiful substitute, molybdenum. Tin is used in the production of containers, solder and bearing metal. There is no domestic supply.

In concluding his address, Colonel Harris again stressed the fact that this country is deficient in many essential materials. He also stated that unless effective emergency measures are taken to conserve available stocks and to supply deficiencies, military operations in a national emergency would be seriously embarrassed and perhaps jeopardized. The steps now being taken by the War Department should help to forestall such a contingency.

Recalls Start of Tin Plate Industry

REMINISCENT of a political campaign of 45 years ago is a pie plate made in 1891 by the Granite City Steel Co. and now in the possession of Hayward Niedringhaus, president of the company. Manufactured from some of the first tin plate which was produced in this country, the pie plates—100,000 of them—were ordered by former President McKinley to dramatize the passage of his McKinley Tariff Act of 1890, which levied a duty of 2.2c. per pound on imported tin plate. The 25th president, who was assassinated during his second term, in 1901, distributed the pie plates at public meetings throughout Ohio during his successful campaign for governor of that State in 1891.

Each of the pie plates was inscribed, "American Tinplate 1891—Made by the St. Louis Stamping Company." The Granite City Steel Co. was formerly the Granite Iron Rolling Mills which was a part of the St. Louis Stamping Co.

Prior to 1890, said Hayward Niedringhaus, virtually no tin plate was produced in the United States, but was imported from Wales. "So great was Welsh supremacy because of low labor costs," he added, "that earlier tin plate enterprises launched in 1873 and 1874 had ceased production. The growing importance of tin plate in American home and frontier life and the desirability of a home industry led to the insertion of a clause relative to tin plate in the McKinley Tariff Act of October, 1890.

"The effect of this tariff on employment and industry was indicated by the fact that, at the close of 1891, there were 20 tin mills in operation in the United States and 10 under construction. At the close of 1897 there were 69 tin mills in operation and seven projected. Today there are 672.

"In 1891 our company did not produce enough tin plate to warrant the keeping of statistics. Last year, however, we produced an amount sufficient to make 219,500,000 tin cans. In 1891 only 50 tons of tin plate were produced in the entire United States. In 1935 the total production of tin plate for the entire country amounted to 1,870,000 tons with a total value of approximately $180,000,000."

CONTROLLED GEAR MANUFACTURE

By J. B. NEALEY
American Gas Association

TOO much emphasis cannot be placed on control when preparing steel parts for mechanical operation. Particularly is this true of automobile gears where the physical characteristics must be of the highest order.

In order to obtain best results, a gear shop should start by exercising control over heats of steel at the mill and keep up this control during subsequent mechanical working and forging operations as well as in machining and heat treating.

Such control is the policy of the Fairfield Mfg. Co. of Lafayette, Ind., which puts out a complete line of gears for automobiles, trucks and tractors. These gears run from the smallest up to sizes measuring 30 in. in diameter and include straight bevels, spiral bevels, spur gears, helical gears, worms and worm gears.

The factory is completely equipped with the most modern types of gear cutting machinery and the most up to date gas-fired heat-treating furnaces. Most of these gears are made from alloy steels such as SAE 2315, 2512, 3115, 4620, and several others. These alloys are produced in steel mills according to Fairfield Mfg. Co. specifications. The customary practice is to submit bar end samples of each heat to the Fairfield Mfg. Co. laboratories for checking. These samples are analyzed chemically, checked for grain size and the bar ends are then given the same heat treatment that the gears eventually receive. The carbon range must be within 0.15 per cent, and on all carburizing types of steel the grain size is held to within 6 to 8 on the A.S.T.M. chart. If found to be within the limits allowed, the steel is then released for shipment to the forge plant.

One of the requirements is that the steel mill heat number shall be placed on the forge shop invoice and this number follows all the way through subsequent operations. Such marking facilitates processing as well as assures the quality of the material. Most of the gear blanks are forged by the upset method and considerable attention is given to obtaining the proper lines of flow. For instance, it is much easier to split a piece of wood lengthwise than to break it across the grain. Hence the lines are made to flow at right angles to the direction of stress application as nearly as possible. If properly made, all stresses will be applied to the side of the grain rather than to the end grain.

Forging Furnaces Gas Fired

In forging, a bar of steel, heated to the correct temperature is set upright in a hammer die. The first blow bulges the sides into a barrel shape and the hammering is continued until a pancake is formed. In this pancake the grain flow is axial from the center. Gear teeth cut from this blank will have the proper flow line structure to best resist the load applied.

All forgings are normalized or annealed, depending upon the type of steel being used. The temperatures employed are normally quite high, due to the almost universal use of fine-grained alloy materials. Gas-fired furnaces are employed

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HIGHLY skilled workmen, accurately controlled furnaces and an intimate knowledge of the history and quality of alloy steels are necessary factors in the production of modern high-grade automobile gears. What steels to use and how to treat them are described in this article, with particular emphasis given to a correlation which has been established between distortion and machineability, and, also, practices employed in the treating of intricate shapes.

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The Fairfield plant has conducted numerous tests to measure the machineability damage of alloys and has found that the principal factors controlling machineability are apparently hardness and reduction of area. Experience seems to indicate that a 175 Brinell hardness number is the prefect machineable hardness. Each point harder than 175 apparently damages the machineability by 0.44 per cent, while each point softer apparently damages the machineability by 0.43 per cent. Each per cent of increase in the reduction of area seems to cause a machineability damage of a corresponding amount. As a basis of comparison, SAE 1112 steel is taken as 100 per cent machineable. Consequently, the normalizing and annealing practice at the Fairfield plant is designed to produce as nearly as possible a 175 Brinell with the minimum reduction of area obtainable. The damage to the reduction of area, however, must not be permanent.

The minimum reduction of area can best be procured with fine-grained steels by placing them in a coarse-grained condition for machineability. This necessitates the use of quite high normalizing and annealing temperatures, with the cooling so controlled as to obtain the hardness desired.

Distortion and Machineability Correlated

A very definite correlation between distortion and machineability has been established by means of tests made in the Fairfield Mfg. Co. metallurgical division. Gears produced from the same heat of steel were divided into two groups. The first group was placed in a sorbitic condition with a hardness of 154 Brinell. Only four gears were obtained per cutter grind. The gears in the second group were placed in a pearlitic state with a Brinell hardness of 154. As many as 40 gears per cutter grind were obtained.

The gears were then marked and carburized and hardened together in gas-fired furnaces. The four gears per cutter grind contracted 0.010 to 0.015 in. in the bore, while all the 40 gears per cutter grind remained at the original size or expanded slightly. The SAE 2315, 3115 and 4615 alloys are heated to 1750 to 1800 deg. F. The gas burners are then turned off and the parts cooled in the furance to 1100 deg. F. and then in air. With certain steels it is sometimes necessary to add a 1250 deg. F. draw, after a furnace cool, to produce the necessary hardness. These steels include Carpenter 158 and SAE 2512, which are heated to 1700 to 1750 deg. F. in a gas-fired furnace, cooled to 800 deg. F. in the furnace, then cooled in the air and finally drawn at 1250 deg. F.

There is a large class of steels such as SAE 1040, 3140, 4140, etc., used for shafts, differential cases, and some gears, which are annealed at 1700 deg. F., cooled in the furnace to 1100 deg. F. and finish cooled in the air. Material such as SAE 1020 or 2015 is normalized at 1800 deg. F. and removed from the furnace to be air cooled.

The Fairfield Mfg. Co. plant is divided into six divisions: (1) turning and drilling, (2) spur gears, (3) straight and spiral bevel gears, (4) grinding, (5) differential case department and (6) heat treating. Practically 90 per cent of the plant equipment is for the removal of metal and 10 per cent for the production of the desired physical properties, but there is a very close correlation. About 90 per cent of the machines are individually motor-driven and automatics are employed whenever possible.

Furnaces Are Gas Fired

There are about a dozen furnaces in the heat-treating division, most of which are of the batch type and can be used interchangeably for various kinds of heat treating. This arrangement provides the necessary flexibility for the great diversity of

work, which ranges from parts the size of a 50c. piece to parts weighing 200 lb. or more. Gas is the fuel standardized upon throughout. Each furnace is equipped with an automatic temperature control and a recording pyrometer. All the recorders are located in one central control room. In addition to the box-type furnaces, the department is equipped with salt bath furnaces, lead pots, and tool-hardening equipment.

For carburizing, the gears are packed with a carburizing compound in inverted-type alloy pots and charged into the oven or box-type furnaces. Test bars of the same material as the gears are placed in each pot. Two pots in each furnace charge have holes drilled in them and additional test bars (⅜ in. in diameter) protrude. When the proper carburizing cycle has been completed, one of these bars is removed and hardened exactly as the corresponding gears are to be hardened. It is then broken, ground, polished, and immersed in a 1-to-1 nitric acid solution. The etching shades are removed with a soft cloth and the case depth read with a Brinell glass. This requires only about 20 min. time, and, if the case is too thin, the second test bar is pulled after a proper time allowance.

When ready, the charge is pulled, the gears are cooled in the pots or quenched direct as specified. The work in each pot is checked separately for case depth from the test bars. These test bars are placed in copper frames for hardening without loss of identity.

Normal pinion failure in the dynamometer test occurs as follows: First, discoloration along the pitch line; second, pitting; third, loss of tooth profile; and, finally, complete failure. Extensive dynamometer tests have shown that box-quenched SAE 4620 drive pinions are practically in a class by themselves in their ability to withstand high skin temperatures without softening.

It is possible to box-quench fine-grained SAE 4620 without developing excessive crystallinity of the case. The only further heat treating necessary on this drive pinion is to soften the shank. This is accomplished with a lead pot draw at 1100 to 1200 deg. F. for from eight to ten min. Sometimes the shank is copper plated to prevent carburizing. The draw is usually applied anyway and particularly so if a keyway is to be cut after the heat treatment.

Distortion Minimized

All ring gears of SAE 2315, 2512, 3115 and some of 4620 steel are allowed to cool slowly in the pots till cold. The reason for this is that a gear removed from the pot, black but still hot, will distort considerably. In fact, it is possible to place a dial indicator on the hot gear and watch the changes. When the gears are cold they are reheated to just above the upper critical point for the core and quenched in oil in a quenching press. Again the fine-grained steel prevents excessive crystallinity in the case while producing high physical properties in the core.

When the distortion characteristics permit, certain parts are box-quenched and reheated. Those with splined holes are quenched on quenching plugs to hold the size to close tolerances. The majority of pinions are of SAE 2512 when the static loads exceed the physical strength of SAE 4620. These pinions are occasionally quenched direct from the carburizing pot at 1700 deg. F. and are reheated to 1400 to 1460 deg. F., depending upon the exact physical properties desired. If maximum strength is desired, a temperature of 1460 deg. F. is reached to insure a fully hardened core. If, on the other hand, maximum toughness is the goal, the pinions are heated to 1400 deg. F. to secure a refined and tough core.

Gears made from the 40 per cent carbon grades of steel are heated in cyanide and quenched in oil as follows: SAE 2340 and 3140 steels at 1500 deg. F. and SAE 4140 at 1575 deg. F. No gears are too large to heat treat.

Treating Impossible Shapes

Many peculiar distortion phenomena are encountered from time to time. Nearly impossible shapes can be treated satisfactorily if sufficient attention is given to overcoming section effect. The Fairfield Mfg. Co. has found that the parts of an expanded hot gear that quench first stay expanded and the remainder of the gear moves toward these rigid sections. For instance, the usual ring gear section consists of a thin web with a heavy tooth section. This kind of section, air-cooled from 1650 deg. F., will contract. On the other hand, some ring gears have a web section larger than the tooth section. Under identical treatment this gear will expand. Many other "queer" solutions can be found to unusual problems if a little ingenuity is employed.

Rockwell, Brinell and scleroscope machines are employed for hardness testing because the engineers specify the hardness in such terms. However, in the plant a 100 per cent file test is added, as the metallurgists here consider the file test to be the most reliable criterion of abrasive resistance. As an extra precaution and final attempt to prevent troubles creeping in, hard scrap is returned to the metallurgical department, where it is broken, fractures examined, microstructure determined and case depth read.

Safety Head Prevents Pressure Explosions

A "SAFETY HEAD" to protect pressure systems in the same manner that fuses protect electrical circuits, has been developed and is now on the market for use in industrial plants and wherever hazardous pressures must be handled.

This device is the result of several years' research, laboratory and field tests by the engineering department of Black, Sivalls & Bryson, Inc., of Kansas City, Mo., and Oklahoma City, Okla.

Each safety head constitutes a carefully designed "weak spot" which will "blow up" safely at just

B.S. & B. Safety Head showing burst diaphragm which relieved pressure to prevent explosion.

the right time to prevent the rest of the system from blowing up or burning up.

The safety head consists of a set of special flanges, which can be attached to any pressure vessel, pipe line, boiler, pump, separator or other pressure equipment. Between the flanges is clamped a spheroidal diaphragm or safety emergency relief disk made of copper, aluminum, Monel metal or stainless steel as required, to protect against corrosion and chemical reaction.

The diaphragms are tested for required bursting pressures and guaranteed to burst within 5 per cent of the pressure stamped on them. When pressure exceeds the safety point, the diaphragm bursts and relieves the pressure, thus saving the equipment and avoiding damage to plant and danger to human life. The relief capacity of one 4-in. safety head is said to equal 32 2-in. safety valves. The diaphragms are inexpensive and can be replaced like changing fuse cartridges. Only the diaphragm blows out leaving the flanges and pressure vessels intact.

Safety heads are used to back up or supplement safety valves in a pressure system, so that if safety valves are too tight, get corroded shut or screwed down or are too small—if lines clog up or freeze—and pressures leap unexpectedly to dangerous proportions, the safety head "goes out" and relieves the pressure before something else blows up, with attendant damage to property and danger to human life.

Wite-Brass, a New Plating Solution

THE Alrose Chemical Co., Providence, R. I., creator of the Jetal process for producing a black surface on steel and iron, is now marketing a "white brass" plating solution under the trade name Wite-Brass. The plate is claimed to be as white as silver, nontarnishing and extremely simple to control.

The Wite-Brass process is said to be inexpensive to install. A steel tank is used to hold the solution and also serves as an anode. The chemicals for the solutions cost less than 20c. per gal. The bath operates at a temperature of 140 deg. to 175 deg. F. at a current density of 25 amp. per sq. ft. No afterbuffing of plated work is required. A mirror finish is obtained on polished work when plated for as much as two hours.

In spite of the fact that Wite-Brass is an alloy plate of three metals, it is said to present practically no difficulty in control and is easier to maintain than an ordinary brass solution. Wite-Brass deposits at the same rate as an ordinary nickel solution. The manufacturer says that it can be plated over any metal surface and is suitable for all types of metal novelties, flatwear, optical goods, reflectors, metal stampings, and, in fact, wherever nickel or silver is usually applied.

The 1937 edition of the Mines Register and Metal Handbook will list and describe about 10,000 copper, gold, silver, lead, zinc and other non-ferrous metal mining companies in North and South America and will contain non-ferrous statistics on production, consumption and prices. In addition a list of consulting mining engineers, and a list of manufacturers and suppliers of equipment and machinery used in mining operations will be included. according to the publishers, Atlas Publishing Co., Inc., 150 Lafayette Street, New York. The edition will be available in 1937, will consist of over 2000 pages and will sell for $25.

Germans Develop New Stainless Steel

ACCORDING to a recent report from Germany, the ordinary grades of stainless steel are "cold and stern to the eye." That is, they "lack the pleasing luster of silver and, even though the difference is subtle, many persons are not enthusiastic about stainless steel tableware for this reason."

To obtain a "warm" color comparable to silver, the Rochlingstahl G.m.b.H., Volkingen, Saar, has developed a new stainless steel which has been given the trade name of Roneusil. This new alloy contains no nickel, but is made up of 8 to 9 per cent chromium and 12 per cent manganese. No mention has yet been made of the carbon content or the amount of any other elements which are deliberately included in the analysis.

Roneusil is rustproof and resistant to acids ordinarily occuring in foods. Its principal use is, therefore, in the manufacture of tableware such as pots, trays, casseroles, knives, forks and spoons. However, knife blades must be made of another material since Roneusil cannot be hardened by heat. The metal possesses a whiter color than carbon steel and resembles silver in appearance. It takes a high polish and does not tarnish or become dull. It is tasteless and non-magnetic. The tensile strength is about 92,000 lb. per sq. in., elongation is about 40 to 60 per cent, and sheets 0.039 in. thick may be drawn 0.546 in. deep.

Roneusil may be soldered or welded. For welding, a special wire is offered which requires no flux. Heat treatment of the joint is not necessary. This alloy is intended to find a place as a substitute for silver and alpaca, and, inasmuch as it contains no nickel, it is cheaper than any other stainless steel on the German market. Its present utility is emphasized by the great shortage of nickel and other non-ferrous metals in Germany.

The maker of Roneusil has stated that the new alloy is intended for the German market alone, for the time being. An American patent application has been filed quite recently, and, although the company has been in touch with several American concerns regarding patent licensing arrangements, there is little likelihood of any definite agreement until the patent is granted.

THIS WEEK ON THE ASSEMBLY LINE

. . . Most large automotive plants have committed themselves on fourth quarter priced steel for fabrication well into February.

o o o

. . . Automotive production holds up surprisingly well in holiday week.

o o o

. . . Bendix works 24 hr. a day and Saturday and Sunday to get back into production following settlement of its nine-day strike.

o o o

. . . The sit-down and sit-in labor strategy is now being used at Midland Steel Products in Detroit to force base increase on piece work.

DETROIT, Dec 1.—Practically all the large automotive buyers anticipated the recently announced price changes for first-quarter steel and have covered on their requirements for fabrication well up into February. Chrysler followed its usual policy of buying ahead when any major price change is in the wind, and the Ford Motor Co. made a buy for an additional 200,000 units. This followed a buy for 100,000 units made about a month ago and one for 200,000 units made in the latter part of August. This action checks very closely with the 500,000 units that have been budgeted for 1937 models for the period up until Feb. 20.

A couple of weeks ago the impression was going around Detroit that steel price changes on forging stock would be made effective immediately, and some jobbing forge shops were given 24 hours in which to cover their requirements. It now appears that they were not only able to place their orders up until today under the fourth quarter prices, but may be able to pick up a few odd items on this basis during the month of December, if the particular mill in question is enabled to make shipment before the end of the month.

With continuous strip mills booked to capacity in December, there is bound to be considerable carry-over into January of fourth quarter price material. It is frankly expected that some of the larger manufacturers who have placed huge orders for body sheets will be receiving this material well past the middle of January on the old price basis. One of the problems of local steel offices in the last few days has been to resist diplomatically the efforts of buyers to place orders for steel on fourth quarter prices that cannot possibly be shipped even at the mill's option until the middle of January or later.

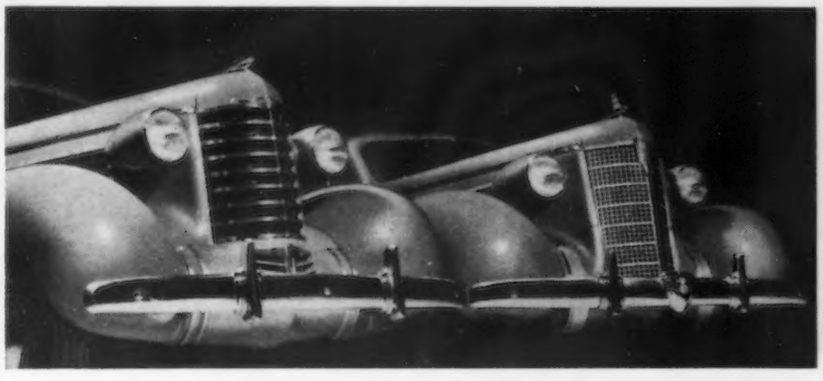
Production during the past week slumped off to 102,399 passenger cars and trucks in the United States and Canada, as compared with 116,325 units the previous week, according to Ward's Automotive Reports. The recession due to the holiday was much less than in the previous year, when volume had dropped to 83,359 units, the reason being that this year many of the plants were opened on Friday and also worked through Saturday. A few parts suppliers worked Sunday as well. During the past week General Motors produced 42,800 units, compared with 48,020 the previous week. Chrysler assembled 22,950 units, compared with 26,650, while Ford showed only a minor drop to 25,725 from an estimated 26,925 the

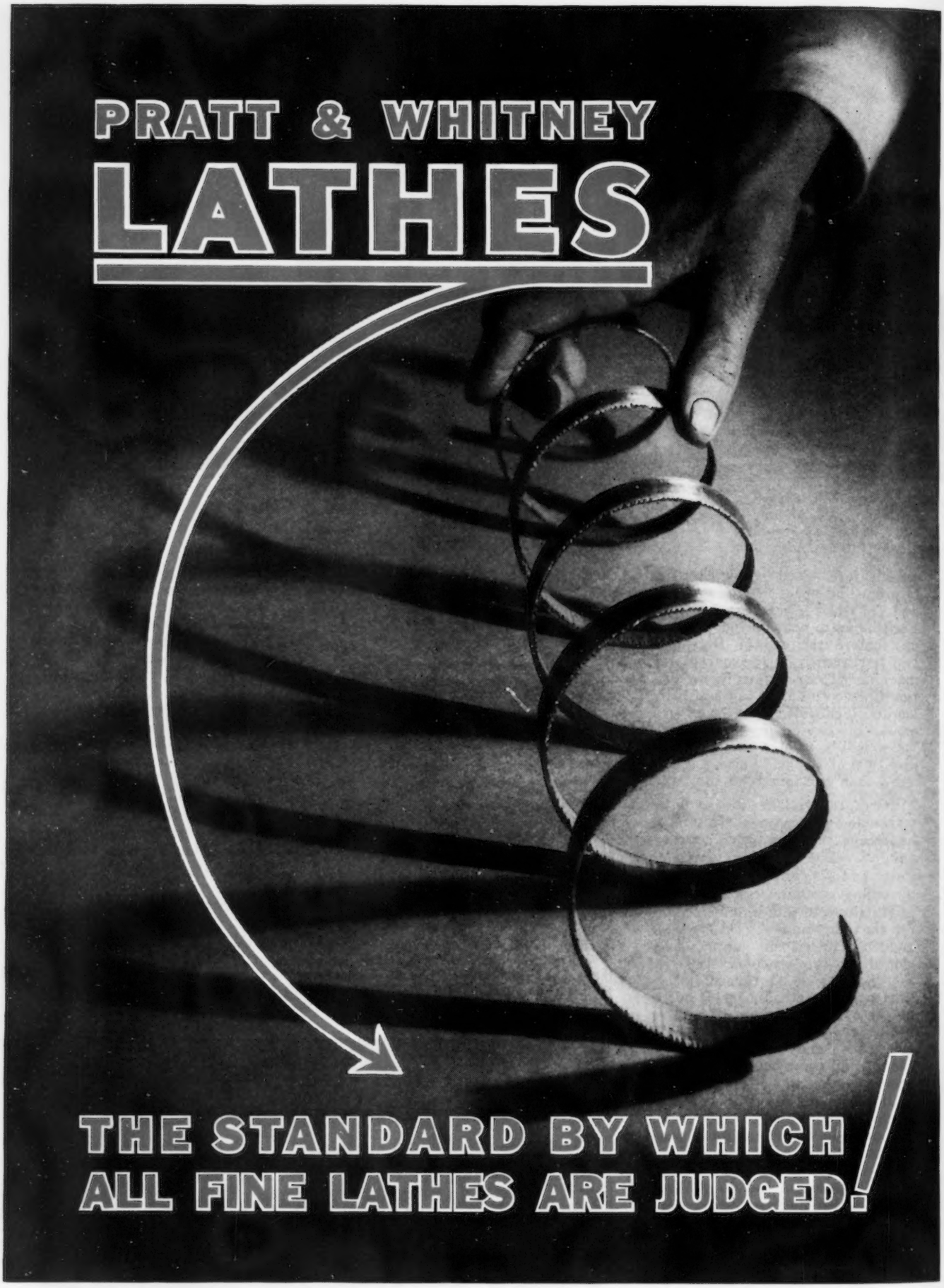
week before. Ford is now currently producing about 5000 cars a day and Chevrolet is reaching for 6000. Ford hopes to achieve 7000 units a day before the end of December and is currently in the market for machinery to strengthen its production lines both on the big and little engine. Scheduled production among the two engines at the peak figure will be 5100 of the large size and 1900 of the small size, slightly more than one-fourth of the total.

Ford's record last week is a remarkable one, considering the handicaps under which the company worked. Bendix Products Corp. had been supplying a part of its requirements on brakes and all of its requirements on carburetors for the small engine. To meet the sudden shut-off in supply occasioned by the sit-down strike at South Bend, Ford turned its organization practically inside out to get into production itself both on brakes and carburetors. Practically every tool and die maker in the place (and there are thousands of them) was set to work making new tools, dies and fixtures and even the trade school boys began making tool parts on the splendid tool room equipment in these school shops. Ford also switched some of its brake business to the Budd Wheel Corp., which was said to be starting on a program of 6000 brakes a day beginning this week, compared with 1500 last week. The Detroit Lubricator Co., which had been making part of the requirements on Ford carburetors for the large engine, also went to work on the carburetors for the 60-hp. job. Observers of the industry cannot recall any previous time when such flexibility in manufacturing set-up was demonstrated.

All of which leads up to the possible effect on Bendix business as a result of its untimely sit-down strike. The South Bend plants resumed activity last Friday and worked full day and night shifts through Saturday and Sunday, in an attempt to reduce the loss of production caused by the nine-day stoppage of work. That much of the business has fled the plant there can be no doubt, since the problem of building up production immediately following the new introductions was such that major buyers of automotive parts simply had to place their requirements elsewhere. Bendix makes brakes for Ford, Pontiac, Oldsmobile, Hudson, Packard, Nash, Lincoln, Cord and Auburn. It also makes carburetors for Ford, General Motors, Chrysler, Hudson and Studebaker, besides parts for many other manufacturers. One assembly line was practically brought to a standstill in Detroit last week for lack of brakes and this particular company's production was reduced to one-third of

TYPICAL of the conflicting trends in radiator grilles are the front ends of the Oldsmobile Six and Eight. Grille at left has a series of bell-shaped louvres faced with thin-gauged stainless while that at the right is a die casting, as in most other General Motors units. Chrysler has gone over exclusively to stampings faced with stainless. Answer: They cost less than die castings.





Pratt & Whitney Division

Niles-Bement-Pond Co.
HARTFORD · CONN.

the volume produced the preceding week. Part of the settlement at Bendix included the taking back of all employees without discrimination "as far as practicable to the extent that there are jobs for them." In other words, the sit-down strikers who have considered so far that the settlement has been largely to their advantage may find that they have killed the goose that laid the golden egg or at least retarded her rate of production.

The settlement of the Bendix sit-down strike is significant in that it points to some of the issues involved in the recently pepped-up drive of the U. A. W. While the company did not accede to the demand of this union to have the company union disbanded, the U. A. W. did succeed in getting the company to recognize its local as the bargaining agent for its membership and all others who choose to avail themselves of its services. The company has agreed to negotiate with this local on all matters with respect to rates of pay, wages, hours of employment or other conditions of employment and shall not finally agree with any other bargaining group with respect to such matters without also having reached an agreement on the same matters with the representatives of the U. A. W. local. There has also been set up a board of review consisting of three members of this local U. A. W. union and three members of the executive staff of the company not connected with the shop management, which board shall hear any complaints of men who are dissatisfied with the decisions of the company's personnel director in any matter concerning employment problems. Another point gained by the union has been made in the provision that employees notified to report for work when no work is then available shall be provided with a minimum of two hours' employment instead of one hour as in the past.

A Sit-Down in Detroit

Hardly had this Bendix affair been settled, when a new sit-down and stay-in strike occurred in Detroit at the plant of the Midland Steel Products Co., one of the big suppliers of frames to the Chrysler Corp. and manufacturer of other automotive stampings. The plant normally employs about 2000 men, and practically all the members of the day shift, to the number of about 1200, continue to occupy the plant after the sit-down occurred last Friday. Negotiations had been going on between officers of the U.A.W. local and the management since Nov. 14. A second set of demands were presented on Nov. 23 and negotiations on these demands were in process when the sit-down occurred, largely as a protest on the part of the workers as to the "stubbornness" of the management in holding out against their demands. In this particular situation, the issue revolves about a general increase in the basic day rate used for computing piece rates. What the workers asked for was a blanket increase of 10c. an hr. The management conceded this in a number of departments but wished to make exceptions, including welders, assemblers, machine shop and all women employees. Like the Bendix affair, the workers are occupying the shop, although all the women employees have left. Those on the night shift pass in food and blankets through the windows to their fellow workers.

While there is little question that if the employers were to take their case to court the men who drop their work but refuse to leave their places of employment could be ousted and prosecuted as trespassers, so far no action of this kind has been taken, largely for fear of sabotage. Obviously the U.A.W. has been encouraged to use this rather unfair labor weapon because of the comparative success at Bendix. It is an outgrowth of the sit-down idea which has been dramatized so frequently at Akron in recent months. This is a new form of passive resistance and a weapon that management has yet to combat successfully without bringing on strife and bloodshed.

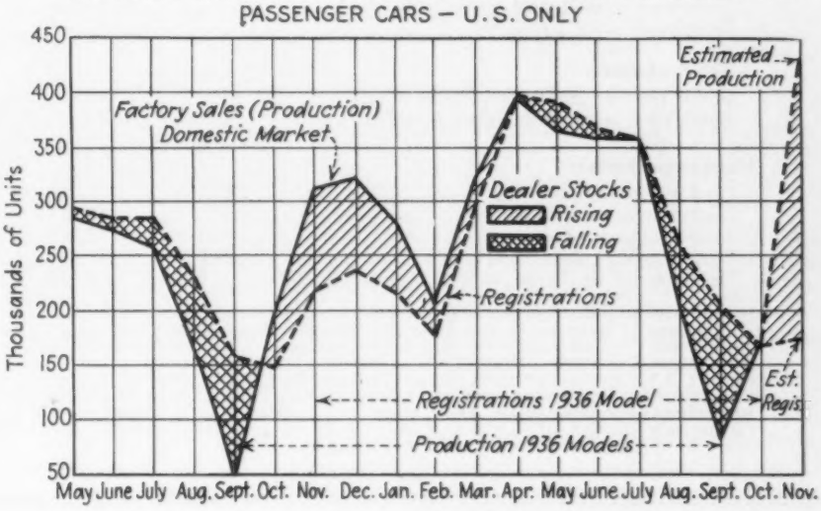
Shortage of frames ordinarily supplied by Midland Steel Products had already reduced the output of Plymouth by one assembly line on Monday. Murray Corp. continues to supply part of Plymouth requirements and most of Dodge's. The strategy of U. A. W. is apparently aimed at halting large motor makers by tying up key parts plants.

Meanwhile production is being pushed as rapidly as possible to meet the tremendous volume of sales. Reports of sales in the first 10 and 20 days of November indicate gains of 50 to 100 per cent over the same period a year ago. As a result, there have been continued upward revisions of 1937 sales schedules, and production schedules are being increased accordingly. As another consequence, the machinery market continues fair on the basis of fill-in equipment to bolster up the lines. The most notable activity in this connection is the Ford Motor Co., which is building up production from 5000 to 7000 units a day. Incidentally, Ford is also preparing to spend $1,700,000 in expansion of its Windsor plant. Of this amount $300,000 will go for a new addition to the manufacturing plant and $1,400,000 will go for new machinery. About 73,000 sq. ft. of floor space are to be added. Work will be started Jan. 1. Packard has also been conspicuous in its purchases of equipment to expand production on component parts, principally gears and front wheel suspension on the 120 and the Six.

Chevrolet's Silver Anniversary

Chevrolet celebrated its 25th anniversary last month. Since November, 1911, the company has manufactured a total of 12,250,275 passenger cars and trucks. Its 25-year history was culminated by passing the 1,000,000 mark this year by the end of November. When Chevrolet first appeared on the automotive scene, there were 185 companies in production. These companies produced 210,000 automobiles in that year. Today, there are 40 producers.

RELATION OF FACTORY SALES TO DEALERS (PRODUCTION) AND REGISTRATIONS
PASSENGER CARS — U. S. ONLY



Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available. Bold Face Type Indicates Changes This Week.

	October, 1936	September, 1936	October, 1935	Ten Months, 1935	Ten Months, 1936
Raw Materials:					
Lake ore consumption (gross tons)[a]	4,384,809	4,026,690	2,910,863	24,735,249	35,818,890
Coke production (net tons)[b]	4,307,849	3,994,741	3,141,851	28,503,247	37,420,040
Pig Iron:					
Pig iron output—monthly (gross tons)[c]	2,992,968	2,730,293	1,978,411	16,835,436	24,557,476
Pig iron output—daily (gross tons)[c]	96,547	91,010	63,820	55,379	80,516
Castings:					
Malleable castings—Production (net tons)[d]	51,778	46,552	43,467	376,520	459,088
Malleable castings—orders (net tons)[d]	55,521	44,361	45,246	362,260	451,147
Steel castings—production (net tons)[d]	.....	76,617	42,597	325,030	.....
Steel castings—orders (net tons)[d]	.....	56,877	34,553	326,914	.....
Steel Ingots:					
Steel ingot production—monthly (gross tons)[e]	4,545,001	4,161,108	3,142,759	27,194,171	38,150,305
Steel ingot production—daily (gross tons)[e]	168,333	160,043	116,398	104,593	146,170
Steel ingot production—per cent of capacity[e]	**76.70**	**72.92**	**52.58**	**47.25**	**66.60**
Finished Steel:					
Trackwork shipments (net tons)[e]	5,547	5,722	3,495	36,114	58,478
Steel rail orders (gross tons)[e]	119,237	25,800	38,742	363,299	804,065
Sheet steel sales (net tons)[f]	223,195	255,557	226,209	1,981,070	2,089,492
Sheet steel production (net tons)[f]	235,057	213,706	222,963	1,991,675	2,143,528
Fabricated shape orders (net tons)[g]	127,303	*116,500	102,708	880,675	1,311,550
Fabricated shape shipments (net tons)[g]	152,999	*144,029	98,444	924,256	1,285,046
Fabricated plate orders (net tons)[d]	33,791	*35,033	30,530	203,615	390,629
Reinforcing bar awards (net tons)[e]	22,135	18,755	31,865	277,840	297,500
U. S. Steel Corp. shipments (tons)[h]	1,007,417	961,803	686,741	6,027,964	8,875,124
Ohio River steel shipments (net tons)[i]	145,065	95,705	104,659	776,170	930,446
Fabricated Products:					
Automobile production, U. S. and Canada[k]	229,989	139,785	283,337	3,349,377	3,692,023
Construction contracts, 37 Eastern States[l]	$225,839,900	$234,271,500	$200,595,700	$1,392,293,400	$2,267,468,100
Steel barrel shipments (number)[d]	.....	787,380	884,888	5,696,681	.....
Steel furniture shipments (dollars)[d]	.....	$1,549,808	$1,562,303	$12,374,298	.....
Steel boiler orders (sq. ft.)[d]	968,473	1,055,502	784,341	5,095,992	8,870,038
Locomotive orders (number)[m]	22	24	0	28	180
Freight car orders (number)[m]	1,310	3,100	810	8,103	38,658
Machine tool index[n]	136.5	118.5	102.9	†102.9	†160.4
Foundry equipment index[o]	174.4	161.0	140.0	†127.1	†160.4
Foreign Trade:					
Total iron and steel imports (gross tons)[p]	.....	59,993	59,569	358,824	.....
Imports of pig iron (gross tons)[p]	.....	15,080	17,168	99,098	.....
Imports of all rolled steel (gross tons)[p]	.....	28,618	24,444	176,762	.....
Total iron and steel exports (gross tons)[p]	.....	235,571	238,358	2,622,825	.....
Exports of all rolled steel (gross tons)[p]	.....	74,459	81,248	724,151	.....
Exports of finished steel (gross tons)[p]	.....	56,040	63,954	620,507	.....
Exports of scrap (gross tons)[p]	.....	152,314	145,850	1,797,468	.....
British Production:					
British pig iron production (gross tons)[r]	670,300	650,800	544,300	5,337,600	6,367,100
British steel ingot production (gross tons)[r]	1,060,500	1,027,000	907,300	8,127,600	9,678,500
Non-Ferrous Metals:					
Lead production (net tons)[s]	42,156	32,982	42,618	339,375	372,271
Lead shipments (net tons)[s]	59,210	50,685	42,271	348,088	411,016
Zinc production (net tons)[t]	46,297	42,283	36,716	353,480	431,479
Zinc shipments (net tons)[t]	54,035	51,847	47,033	375,486	446,345
Deliveries of tin (gross tons)[v]	6,005	6,200	5,355	49,715	61,730

†Three months' average. *Revised.

Source of figures: [a] Lake Superior Iron Ore Association; [b] Bureau of Mines; [c] THE IRON AGE; [d] Bureau of the Census; [e] American Iron and Steel Institute; [f] National Association of Flat-Rolled Steel Manufacturers; [g] American Institute of Steel Construction; [h] United States Steel Corp.; [i] United States Engineer, Pittsburgh; [k] When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of Census; [l] F. W. Dodge Corp.; [m] *Railway Age*; [n] National Machine Tool Builders Association; [o] Foundry Equipment Manufacturers Association; [p] Department of Commerce; [r] British Iron and Steel Federation; [s] American Bureau of Metal Statistics; [t] American Zinc Institute, Inc.; [v] New York Commodities Exchange.

Weekly Index of Rate Activity in Capital Goods, Adjusted for Seasonal Variation, 1925-27 Average = 100

THE IRON AGE Weekly Index Numbers of Capital Goods Activity

(1925-27 Average = 100)

Last week	95.2	Same week 1933	47.3
Preceding week	89.0	Same week 1932	35.2
Same week last month	84.2	Same week 1931	51.7
Same week 1935	72.1	Same week 1930	78.2
Same week 1934	43.4	Same week 1929	97.4

THE IRON AGE's general index of heavy industrial activity set a new peak last week, having risen to 95.2 per cent of the 1925-27 average of "normal" as against a previous high this year of 90.8 per cent established in August. This was the highest the index has been since the end of June, 1930. For corresponding weeks it was the highest since 1929, the figure for that period having been 97.4, or only 2.2 points above the latest showing.

Gains were recorded for all five seasonally adjusted indices of the general activity index last week, the largest increase having occurred in the automobile production series. Although the volume of cars produced receded slightly from the preceding week, a working week shortened by the Thanksgiving holiday made for higher output on a daily basis. The increase was more than seasonal. The remaining four series registered gains both before and after adjustment, but in some cases seasonal correction contributed to these increases.

The index of steel mill activity has shown substantial strength for a considerable period. Shipments of lumber have likewise been active.

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Cram's Reports, Inc.; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

New Standards Issued by A.S.T.M.

THE American Society for Testing Materials, Philadelphia, has just issued its 1936 Book of A.S.T.M. Standards. This triennial publication contains all of the standard specifications, methods of test, recommended practices and definitions formally adopted by the society. The 1936 issue is in two parts—Part I giving in their latest form all A.S.T.M. standards covering metallic materials; Part II, all standards relating to non-metallic materials. Both parts aggregate 2400 pages.

In each part, the specifications for a particular class of material are given first, followed directly by the test methods, definitions, etc. A complete subject index lists each standard under the principal subject covered, with the keywords in alphabetical sequence. This index, together with two tables of contents, one listing standards by the materials covered, the other in order of sequence of the serial designations facilitates the use of the book.

WASHINGTON. . . . . .

. . . *Capital discussions now concerned chiefly with new legislation that Administration may favor at coming session of Congress.*

o o o

. . . *Senator O'Mahoney's Federal incorporation licensing bill being pushed forward —NRA revival doubted except in very much modified form.*

o o o

. . . *30-Hr. week bill will be introduced— Labor favors it, but attitude of the Administration has not yet been made clear.*

o o o

By L. W. MOFFETT
Resident Washington Editor, The Iron Age

o o o

WASHINGTON, Dec. 1.—Rumors are afloat in great volume as to what President Roosevelt may ask of the next session of Congress regarding industrial regimentation.

Another NRA? The O'Mahoney Federal corporation licensing bill? Tax exemption for corporations which increase employment and payrolls? A constitutional amendment? The 30-hr. labor bill? And so forth.

By going to the various groups supporting these proposals an affirmative answer will be given. But in no case will it be given on the authority of the Administration. For the sufficient reason that no such authority exists. The only person who can speak authoritatively for the President is the President himself. On none of the questions has he gone on record. No doubt he could definitely state his position on some of them at this time. But it is doubted that he has as yet determined a specific legislative course. The one definite statement made by the President as to his plan for such legislation is that the need for coal legislation is obvious. Assurance that he would ask for such legislation no doubt was an important factor that led John L. Lewis, president of the United Mine Workers, to campaign vigorously for the reelection of the President. Precisely how the Guffey coal bill can again be passed and be satisfactory to Mr. Lewis it is difficult to see unless it were pushed through Congress without regard to its constitutionality. The Supreme Court knocked out the Guffey Act.

There are strong indications that much more care will be shown hereafter than previously with respect to framing legislation within constitutional limits. For this reason it has been suggested that coal and other labor legislation dealing with wages, hours, collective bargaining, etc., will undergo considerable modification, the nature of which is not clear.

NRA Would Be Greatly Modified

As to another NRA, it is not believed that the Administration has any idea of reestablishing it on anything like its original form, even if it could be framed within the Constitution. A number of so-called substitutes have been suggested and are even being worked on by some who apparently are close to the White House. The President has not indicated that he will recommend any of them. It is held to be conceivable that he might support some form of a NRA for individual industries, such as coal and textiles, but certainly the old NRA, even before it was held unconstitutional by the Supreme Court, had bogged down almost to the point of total collapse and delayed recovery. It was too unwieldy and unable to serve as an over-all control of the intricacies of the widely diffused and highly complicated industrial system of the country. Hence it would seem revival of an all-embracing NRA will not be attempted.

Senator O'Mahoney has instituted a publicity campaign in behalf of his Federal licensing bill which he will again introduce. It has the support of the American Federation of Labor and the rebellious Committee for Industrial Organization, headed by John L. Lewis. But the President has never gone on record with regard to the measure. Without passing on their accuracy, attention has been directed to rather definite reports that he will not get back of it, despite pressure being brought by organized labor, which gave him overwhelming political support in November.

In the estimation of some legal authorities, the bill would not serve its purposes and would have the result of destroying the sound State charters. The bill has been suggested as a substitute for the NRA. Proposed legislation of this kind runs back a half century. It has been the object of an extensive report by the Federal Trade Commission and of Congressional hearings. Under the O'Mahoney bill both incorporation and licensing under Federal charters would be compulsory. Before a corporation could be granted a license it would have to agree not to employ child labor, not to discriminate against women and to fix a standard minimum wage and maximum working day. Enforcement would be in charge of the Federal Trade Commission. Its constitutionality has been attacked by its opponents. The measure differs from that once proposed by former President Taft, who would have made the matter of Federal licensing volun-

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ALLEGHENY PRODUCTS: SHEETS FOR AUTOMOBILE BODIES, METALLIC FURNITURE, DEEP DRAWING; ALLEGHENY METAL, ALLEGHENY STAINLESS STEELS, ELECTRICAL SHEETS, HOT & COLD ROLLED STRIPS, STEEL CASTINGS, SEAMLESS TUBING, BOILER TUBES, PIPE.

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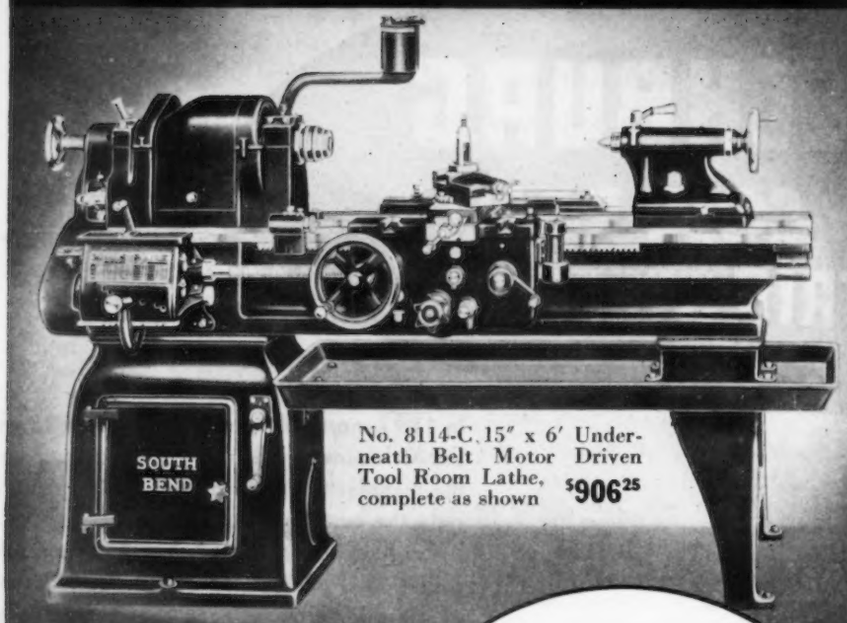
WEST LEECHBURG . . . HEADQUARTERS FOR STRIP STEEL, *including all grades of* ALLEGHENY STAINLESS

tary. Voluntary Federal incorporation was endorsed by the late Judge E. H. Gary in the course of testimony before the Senate Labor Committee in connection with the 1919 steel strike.

The O'Mahoney bill would authorize the Federal Trade Commission to prepare a general program for the "coordination, stabilization and orderly" development of the basic industries of the country. It would also be authorized to make recommendations to Congress looking to the elimination of unfair trade practices. Except by vote of stockholders, payment of bonuses would be forbidden. Among other features of the voluminous bill is a provision designed to prevent manipulation of corporate funds for the benefit of the management. Under stated conditions, surpluses would have to be divided either with stockholders or employees, such as is now being done, due to a considerable extent to the new tax law.

NEW 1937
SOUTH BEND *Precision* LATHES
Modern Lathes for Modern Industry



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Those who doubt that the Administration has actually turned thumbs down on the O'Mahoney bill point to the fact that when the President was recently asked about his attitude toward it he referred inquirers to a two-year-old report of the Federal Trade Commission on Federal incorporation.

The use of taxing power to enforce "distribution of wealth" by increasing wages and declaring dividends has given rise to reports that study is being given to the question of tax exemption to increase employment and payrolls by private industry. The President, as is well known, long has urged private industry to increase employment and payrolls. While the sharp impetus in both directions has been a source of gratification, the Administration hopes for much further progress, desiring to cut down relief rolls and to reduce Federal costs. The recommendation is one of those he recently laid before the Business Advisory Council and is being studied by it as well as by other industrial groups. The idea of tax exemption provides for reduction in taxes or credit for corporations which increase employment and payrolls. Whether it is being given Administration consideration is not known. It is recalled that a similar suggestion was made unofficially by certain economists and industrial groups in connection with tax legislation at the last session of Congress. It apparently did not receive sympathetic consideration at that time by the Administration.

Constitutional Amendment Doubted

It is seriously doubted that the Administration will seek a constitutional amendment which has been widely urged in several quarters, particularly by organized labor, in order to fix minimum wages and maximum hours. Administration sources, so it is reported, do not think the proposal is sound. It would involve a long process to obtain ratification, if it could be obtained, by three-fourths of the State legislatures.

The 30-hr. week bill of course will again be introduced. It also has the support of the American Federation of Labor, though it is believed that some officials in the federation support it merely as a matter of labor politics and do not believe in its economic soundness. The Administration has never indicated that it favors the measure. On the contrary, in the past some of the ablest Administration advisers have strongly opposed it, including some who are altogether friendly toward organized labor.

It appears to be reasonable to

think that the Administration position toward industrial regimentation depends on certain developments. In the event that the Wagner Labor Disputes Act is held unconstitutional, it is definitely believed some kind of labor legislation in its place will be urged. Again, it is reported that the Administration is awaiting the outcome of the widespread campaigns being waged by organized labor to unionize industry. Particularly in mind, it is said, is the move toward industrial unionization, the key example being the attempt by Lewis to organize steel. The CIO thought is that organization of mass industries along vertical lines would be the answer to minimum wages and maximum hours and that by comparison legislation would be either unnecessary or only incidental. There can be no doubt that, despite the small progress it has made, the CIO is staking the success of its campaign on its drive in the steel industry. Lewis' efforts to organize steel and other mass industries are of course made extremely difficult, not only by reason of the task itself, but also because of the split in the ranks of the American Federation of Labor. Craft unionists, as again emphasized at the Tampa, Fla., convention, are bitterly hostile to the CIO. The split in the ranks of organized labor also is said to be a source of disturbance to the Administration. When confronted with conflicting demands from the two factions it obviously would be placed in an unenviable position. No doubt it is hoped the organized labor breach will be healed.

Berry's Meeting This Week

It is quite conceivable that the different legislative proposals mentioned will find support at the hands of Major George L. Berry, Coordinator for Industrial Cooperation, at the meeting here next Thursday and Friday of representatives of industry and labor with the Council for Industrial Progress. The council will make a report at the meeting. The meeting of last December broke up in a healthy row when there was a general walkout of representatives of large industries who objected to Berry's agenda. It covered a great deal of proposed legislation such as has been listed.

Berry has denied published reports that his meeting will be poorly attended. On the contrary, he claims he has received wide acceptance to invitations. He has admitted that it may not be so largely attended as it would be otherwise if it were not for the meeting in New York on Dec. 9 and 10 of the Congress of American Industry. Berry set the dates for the council meeting after the Congress had set dates for the New York meeting. Such large employing industries as steel, automotive, metal-working, and lumber have not accepted the Berry invitation. It is said that some of them will send "unofficial observers."

Berry will report the results of the meeting and its recommendations, if any, to the President for consideration in connection with a prospective legislative program. Similar action will be taken by Secretary of Commerce Roper when he receives recommendations from his Business Advisory Council. The purported purposes of both Berry's council and Roper's council are identical in many respects. That the reports will sharply conflict is evident. Charges have been made that each council has been trying to torpedo the other.

In any case, decision on recommendations to be made will rest with President Roosevelt.

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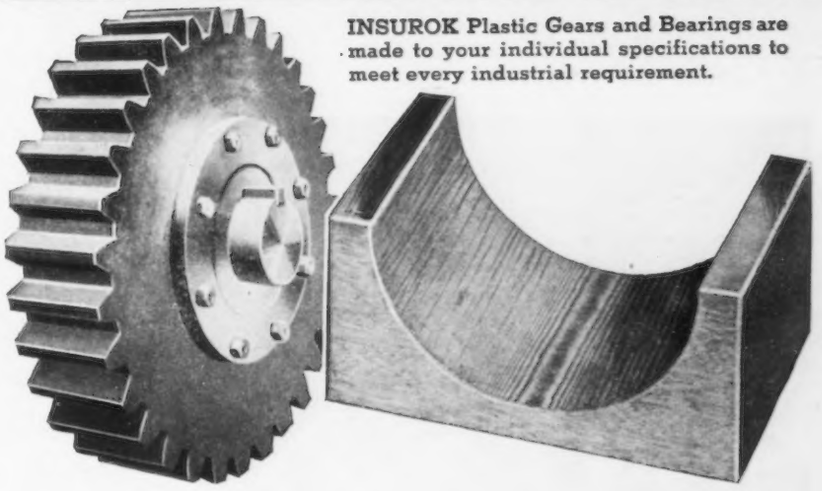

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34,113 Freight Cars, 100 Locomotives Installed by Railroads up to Nov. 1

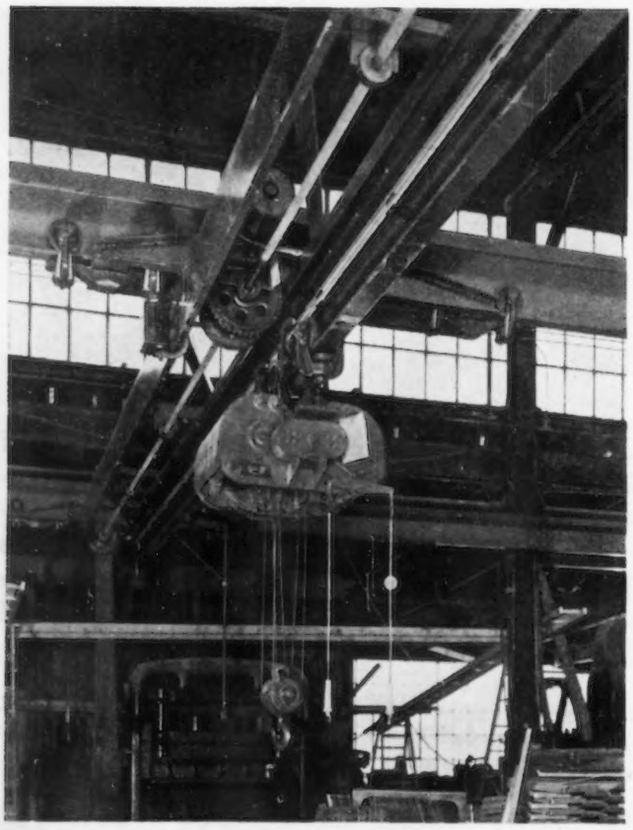
WASHINGTON, Dec. 1.—In the first 10 months of the current year Class I railroads placed in service 34,113 new freight cars, the largest number installed in any corresponding period since 1930, according to the Association of American Railroads. They exceeded by 29,321 the number of cars installed in the January-October period of 1935 and represented an increase of 12,442 over the number placed in service in the corresponding period of 1934. The new cars installed in the 10 months' period of the current year included 15,350 coal cars; 14,621 box cars; 2819 refrigerator cars and 1323 miscellaneous cars. On Nov. 1 these railroads had on order 14,068 new freight cars, compared with 6433 on Nov. 1, 1935, and 3080 on Nov. 1, 1934.

New locomotives placed in service in the first 10 months of 1936 included 73 steam and 27 electric and diesel engines, compared with 31 steam and 102 electric locomotives installed in the corresponding period of last year and 22 steam and 16 electric locomotives installed in the corresponding period of 1934. New locomotives on order Nov. 1, this year, included 67 steam and 10 electric and diesel engines, compared with 14 steam locomotives and three electric engines on Nov. 1, 1935, and 34 steam and 101 electric locomotives on order Nov. 1, 1934.

Air Conditioning of Cars

On Oct. 1, the railroads and the Pullman Co. had 7846 air-conditioned passenger cars in service, according to J. J. Pelley, president of the Association of American Railroads. During the past six months 1698 passenger cars were air-conditioned. Of the total, the railroads had 3777 air-conditioned passenger cars on Oct. 1, compared with 2731 on April 1, last, or an increase of 1046. The railroads now have 2185 passenger coaches which have been air-conditioned, 771 having been added within the past six months. In addition, they also have 874 dining cars and 718 other classes of passenger equipment which have been air-conditioned. The Pullman Co. on Oct. 1 had 4069 air-conditioned passenger cars, of which 652 were equipped with air-conditioning devices in the past six months. These cars include not only sleeping cars, but also other passenger equipment.

The Equipment Research Division of the association has for some months been conducting an investigation into the air conditioning of passenger equipment with a view of ascertaining what further improvements can be made and what can be done toward further standardizing such equipment in an effort to reduce installation and maintenance costs. This research work has now been completed and the report is expected to be ready to submit to the board of directors of the association soon.



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Floating Dry Dock Bids Rejected

WASHINGTON, Dec. 1.—Because they exceeded the Congressional appropriation of $10,000,000, Secretary of the Navy Swanson has announced rejection of bids of the Bethlehem Shipbuilding Corp., ranging from $16,604,000 to $21,312,000, for construction of a 165-ft. x 1016-ft. floating drydock for use at Pearl Harbor, T. H. The Bethlehem Shipbuilding Corp. was the only bidder. Estimates were also submitted by West Coast navy yards, but also exceeded the appropriation.

The Navy Department will ask the next session of Congress for an increased appropriation for the construction of the giant drydock. The minimum bid submitted by the Bethlehem Shipbuilding Corp. provided for building of the structure without equipment, while the maximum called for construction of the drydock together with complete equipment. The drydock will call for 40,000 tons of structural steel, instead of previously published estimates of 30,000 tons. Rivet requirements alone are 2500 tons. Bids were opened last Wednesday by the Bureau of Docks and Yards.

Employee Elections Upheld by Court

WASHINGTON, Dec. 1.—The right of the National Labor Relations Board to hold employee elections to determine collective bargaining representation was upheld recently by the United States Court of Appeals in Washington. It involved what is known as the case of Heller Brothers & Co., Newcomestown, Ohio, hardware manufacturers, and also applied to six other plaintiffs—the Bethlehem Shipbuilding Corp., the Pilgrim Group, A. C. Leather Co., Brown Shoe Co., Beaver Mills Corp., and Cabot Mfg. Co.

The lower court, through Justice Adkins, held the act to be unconstitutional, as contended by the companies, but the decision of the Appellate Court, which was unanimous, did not pass on the question of constitutionality. The appellants asked for an injunction to enjoin the board from conducting hearings for the purpose of determining whether elections should be held. They maintained that they would be irreparably damaged by the proposed elections, claiming they would result in disorder, loss of efficiency and destruction of the morale of employees.

The Appellate Court said that the allegations charged in the appeal showed neither threatened damage nor irreparable damage. It was held that no irreparable damage could result from the procedure authorized by the act which was said to provide easy access to the courts whenever it is believed it has arbitrarily exercised power conferred upon the board by the act.

The court said that the fact that employers would be subject to some expense and time made no difference.

"These losses," the court declared, "will have to be borne by the employers without redress because they are incident to every sort of trial and are part of the social burden of living under governments. They are not the irreparable damage as to which equity will interfere to prevent."

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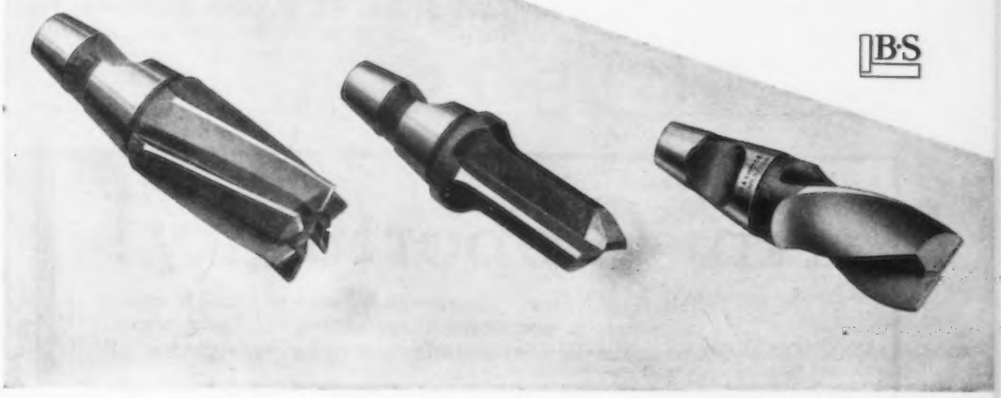

Secretary Perkins Clarifies Position of Dealer Under Walsh-Healey Act

WASHINGTON, Dec. 1.—Secretary of Labor Frances Perkins last Wednesday formally promulgated an additional regulation to prevent dealers from defeating the intent of Congress in the Walsh-Healey (8-hr. day, 40-hr. week) Act by selling goods to the Government produced in plants which are not complying with the labor standards of the law. Previously she had announced that when a dealer makes a contract with the Government and has the products shipped direct to the Government from a plant the manufacturer as well as the dealer is made a party to the contract.

The regulation reads as follows:

"Whenever a dealer, to whom a contract within the act and regulations has been awarded, causes a manufacturer to deliver directly to the Government the materials, supplies, articles or equipment required under the contract, such dealer will be deemed the agent of the manufacturer in executing the contract. As the principal of such agent the manufacturer will be deemed to have agreed to the stipulations contained in the contract."

"The effect of this regulation," Miss Perkins said, "is not to eliminate dealers from bidding on Government contracts but to check a practice which has been reported by various contracting agencies the past few days under which dealers, instead of furnishing goods from stock, have been placing orders with factories which are not conforming to the labor conditions of the law and having such factories ship their products direct to the Government. As a result of this practice there have been some instances where manufacturers, submitting proposals in their own name and thereby expressly agreeing to the stipulations required under the act, have been placed at a competitive disadvantage.

"While it is true that the act permits dealers having goods on hand to fill Government orders out of their own stock, it is clearly contrary to the intent of Congress that a dealer, acting merely as a broker, should select factories which are not complying with the act.

"Under this regulation bids will still be received from dealers, but the Government will look to manufacturers who are supplying goods in accordance with a Government order to carry out the representations as to labor conditions regardless of whether or not they actually signed the proposals."

The Department of Labor is issuing bulletins from time to time carrying the names of contractors who have received Government awards and have complied with the terms of the act. Among the lists are the following, together with the products: Jones & Laughlin Steel Service, Inc., Long Island City, N. Y., sheet steel piling; Florence Pipe Foundry & Machine Co., Philadelphia, cast iron pipe; Dudley Bar Co., Birmingham, reinforcement bars; Steel Tank & Pipe Co. of California, Berkeley, Cal., steel pipe; Baxter Steel Equipment Co., Indianapolis, metal kitchen cabinets and dressers; United States Pipe & Foundry Co., Kansas City, Mo., cast iron pipe; Union Drawn Steel Co., Massillon, Ohio, steel; Isaacson Iron Works, Seattle, Wash., road scrapers; United States Steel Products Co., Washington, steel rails; Bethlehem Steel Export Corp., New York, steel rails and tie plates; York Ice Machinery Co., Atlanta, Ga., air conditioning; Westinghouse Electric & Mfg. Co., Pittsburgh, switchboard; Aluminum Co. of America, Pittsburgh, electrical conductor; Lackawanna Steel Construction Co., Buffalo, structural steel; Lehigh Structural Steel Co., New York, structural steel; Roofing & Supply Co., Chattanooga, Tenn., metal shingles; Edwards Sheet Metal Works, Fredericktown, Ohio, sectional plate and structural steel arch; Jessop Steel Co., Washington, Pa., steel sheets and plates; Birdsboro Steel Foundry & Machinery Co., Birdsboro, Pa., castings; Erie Forge Co., Erie, Pa., forgings.

An Opportunity!

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Robinson-Patman Act Test Starts Monday

WASHINGTON, Dec. 1.—The first hearing on a complaint charging violation of the Robinson-Patman Anti-Price Discrimination Act will be held by the Federal Trade Commission in Boston next Monday and is expected to pave the way for test of the constitutionality of the law before the Supreme Court of the United States.

The case is that of Bird & Son, Inc., its subsidiary, the Bird Floor Covering Sales Co., both of East Walpole, Mass., and Montgomery Ward & Co., Chicago. Bird & Son and its subsidiary are charged with selling floor coverings to Montgomery Ward & Co. at substantially lower prices than such products are sold to competing retailers. The same complaint alleges that Mongomery Ward & Co.

violated the act by knowingly receiving the alleged discrimination in price given by Bird & Son and its subsidiary. Under the law, the buyer, as well as the seller, is made guilty of discrimination in price.

Indications are that the proceeding, particularly because it is the first of the kind, will be prolonged and involve a large volume of testimony.

Individual answers by the respondents in addition to denying the charges of price discrimination contend that the commission is without authority under the Constitution to regulate the sales and terms. It is charged the act violates the tenth amendment of the Constitution in that it purports to regulate sales wholly within the states and is also unconstitutional because it attempts to fix prices and impose other restrictions without due process of law.

The Montgomery Ward answer also says the act is unconstitutional "in that it forbids the doing of acts in terms so vague, indefinite and uncertain that it fails to inform the individual what is unlawful." It is further charged that the act is unconstitutional in that Congress has attempted to delegate legislative power to administrative officials in violation of the fifth amendment.

Freight Rate Hearing Set for Dec. 10

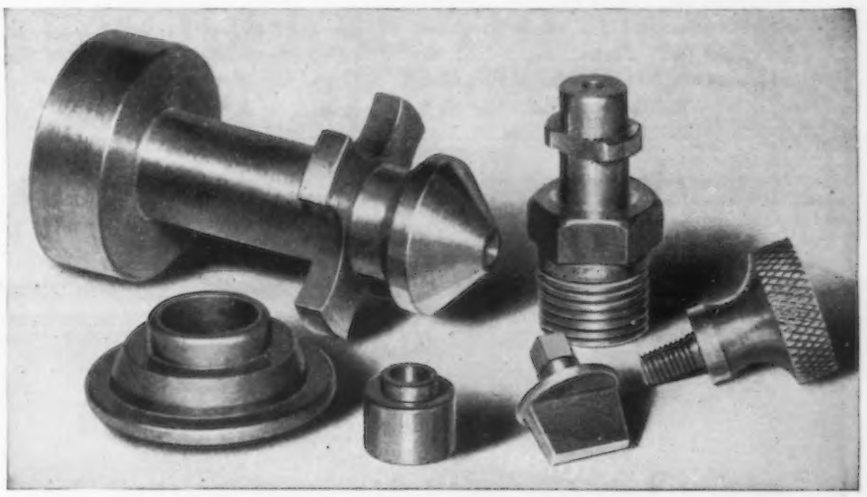
WASHINGTON, Dec. 1.—The Interstate Commerce Commission recently set Dec. 10 as the date for oral argument on the petition of the railroads to continue existing surcharges for 60 days after action by commission on its previous petition to increase basic rates upon the expiration of the emergency rates. The latter, unless continued, will expire Dec. 31. Hearing on the petition to increase basic rates has been set for Jan. 6. Requests for assignment of time for argument to be heard Dec. 10 must be filed with the commission by Dec. 4.

Railroads to Pool Ore Shipments

WASHINGTON, Dec 1.—In a decision announced last Saturday, the Interstate Commerce Commission approved a proposed contract between the Chicago & North Western, the Escanaba, Iron Mountain & Western and trustees of the Chicago, Milwaukee, St. Paul & Pacific Railroad providing for the pooling of ore traffic from the Menominee range in Michigan and Wisconsin to Escanaba, Mich.

The contract provides that the Milwaukee shall handle with its road trains and crews ore from the mines in the vicinity of Amasa, in the Menominee range, over its own line to Iron Mountain, where ore will be delivered to the North Western. All other ore from the Menominee range will be handled by the North Western from production points to Escanaba over its own rails. From Iron Mountain to Escanaba the loaded ore cars will move over the line of the Escanaba, Iron Mountain & Western, a subsidiary of the North Western, and the empty cars will move back from Escanaba to Iron Mountain over the North Western.

Under the new arrangement the Milwaukee will abandon use of the Escanaba company's track and will be accorded use of the North Western's dock at Escanaba for handling ore from the Menominee range. The Milwaukee's two docks at Escanaba are in such a state of deterioration that they are not usable.



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E. T. Weir Opposes Cost-of-Living Factor in Steel Wage Agreements

PITTSBURGH, Dec. 1. — More than 7500 steel workers in independent plants west of the Alleghenies, have been granted increases ranging close to 10 per cent. These companies are those which comprise the Western Sheet & Tin Plate Manufacturers' Association and are unionized by the Amalgamated Association of Iron, Steel & Tin Workers. The announcement followed a conference in Pittsburgh last week between Michael F. Tighe, head of the Amalgamated and the wage committee of the Western association.

Another feature in the last week's labor picture was a statement by E. T. Weir, chairman of the National Steel Corp., who attacked the method of tying in wage increases with the cost of living. Mr. Weir's statement follows:

"The public seems to have gained the mistaken opinion that the steel industry as a whole has adopted this sliding scale of wages. So far as I know, no other steel company excepting United States Steel Corp. has done so.

"In our own case, after negotiations with our employees' representatives, a wage increase was arrived at which was mutually satisfactory. We didn't close the door to future negotiations about wages and we did not peg increases or decreases to the cost of living. There are always factors to be considered in changing wages other than the cost of living.

"I cannot subscribe to the theory of chaining wages to living costs, because, if carried to its natural conclusion, this arrangement would halt future advances in standards of living. In the past 40 years we have witnessed a great and general improvement in living standards. Many things have contributed to this, but fundamentally. the improvement has been due to a steady and favorable 'spread' between wages and living costs. As I see it, any attempt to permanently establish the living cost index as the sole barometer for wage adjustments would tend to retard the continuous increase in real buying power which has been and should be the goal of all industry."

A committee of employee representatives from the Jones & Laughlin Steel Corp.'s two plants have requested their management to recognize their right to deal directly with the president of the company or the chairman of the board. This request had been presented before and the company had offered a compromise agreement which would give the general superintendent more bargaining power than heretofore. This agreement was unsatisfactory and the employee representatives are repeating their first request.

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Colorado Fuel to Spend $2,225,000

COLORADO FUEL & IRON CORP., Denver, will start work immediately on an improvement and modernization program estimated to cost $2,225,000, the largest improvement schedule for the company in seven years. Fifty-four separate projects are included. These cover a new warehouse, numerous mill changes, repairs at mining properties, expansion of the number of products manufactured and improvement in storage and shipping facilities. In announcing this program the company informs THE IRON AGE that "the outlook for western territory of which Denver is the trade center is good and expected to be better."

National Income Up To New Peak Level

THE national income produced in the United States in September not only recovered fully from the set-back in August but rose to a new high peak for the long-term upward trend which has been in progress since early in 1933, according to the Alexander Hamilton Institute. The September income amounted to $5,383,000,000, as compared with $5,025,000,000 in August and with the previous recovery peak of $5,376,000,000 in October of last year. The national income in September this year was 13.5 per cent larger than in the same month last year and more than double the depression's low figure of $2,778,000,000 in March, 1933. At the same time, it was 30.9 per cent below the pre-depression peak of $7,786,000,000 in October, 1929.

The national income in the first nine months amounted to $43,584,000,000 this year as against $37,730,000,000 last year, an increase of 15.5 per cent. It is probable that when the figures for October become available they will show that the national income reached another new high peak for the recovery movement. The prospect still remains, however, for a recession during November and December.

Domestic Production Of Manganese Ore

THE domestic production of manganese ore in 1935 was 26,428 gross tons, or about the same as in 1934, according to the U. S. Bureau of Mines. Expanded activity in the steel industry resulted in increased demand for manganese ore, but the increase was met by increased imports. The imports for consumption in 1935 totaled 383,501 gross tons, containing 189,256 tons of manganese. Of these imports, 40 per cent came from Russia, 25 per cent from the Gold Coast, 15 per cent from India and 11 per cent from Cuba.

Sees Factory Building Boom in 1937-'38

INCREASING activity throughout the manufacturing industries is paving the way for the most intensive period of factory construction in American history, according to George A. Bryant, Jr., of Cleveland, executive vice-president of the Austin Co., industrial engineer and builder. His statement followed a three-day conference with Austin sales engineers, who reported on the outlook in individual industries and communities from Coast to Coast.

"With factory construction already 80 per cent ahead of last year and gaining momentum with each succeeding week despite the approach of winter, there is every reason to expect next year's demand for industrial building to double 1936," Mr. Bryant said. "The past eight months have proven conclusively that we have moved out of the mere modernization stage into a period of essential plant expansion. Growing business volume is making the inadequacy of present facilities apparent in almost every field of industry and many manufacturing centers. The consumer goods industries have been increasing capacities for several years and

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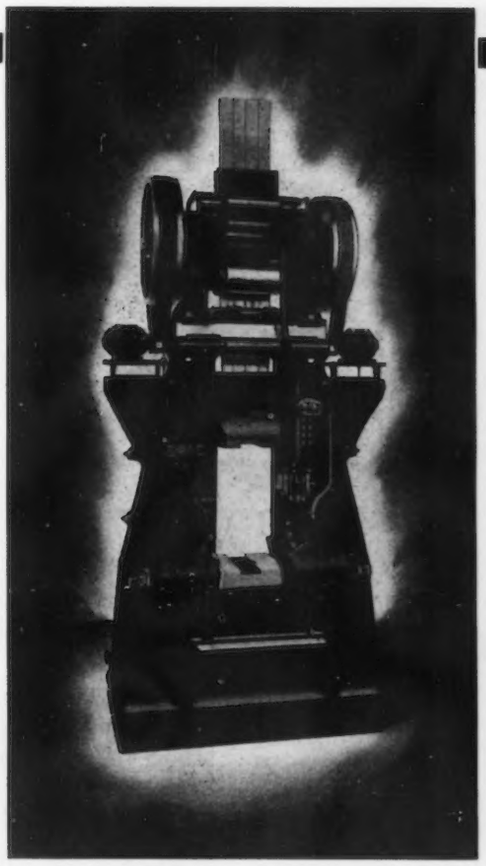

You are going to fall if you don't keep going ahead. During the last few years the drop forging industry has, of necessity, done some remarkable feats of trick riding. It has been a fine, praiseworthy performance. But now the course opens out ahead, and you can't even keep your balance, let alone keep in the race, unless you keep moving forward.

For six years now more hammers have worn out than have been replaced. That's one reason why your deliveries are not what your customers would like. Very definitely it would be good economy to scrap 30% of the hammers now in use. That's one reason why you can't meet the prices of a competitor who has installed modern ERIE Forge Shop Equipment.

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are still going strong. Improvements cannot be launched or finished quickly enough. Machinery and heavy equipment builders are back in the market themselves.

"Back of the present demand are factors that go way beyond the deferred improvement of the depression. Everyone who can foresee a need to build recognizes that the sooner the work is done, the less it will cost and the greater will be the opportunity to capitalize on plant efficiency during the current rising cycle of business. There is already a serious shortage of skilled building mechanics in many sectors and this condition will grow more serious before it improves.

"Many industries are already well above their normal per capita production, some even beyond the average monthly output for 1929. Scores of new industries and products have been developed, many with a rapidity which makes them major factors in the country's total manufacturing output. They are in the throes of their first real expansion, facing plant and equipment needs which that initial growth entails. The diesel locomotive industry is typical of this trend, and there we find a plant, completed less than a year ago, already doubling capacity.

"With other forces closing in on every side, industry is finding that the only real profit opportunities lie in the fullest application of modern materials, improved high-speed machines and handling equipment, all integrated in production which requires flexibility of plant. Beyond this, there is a growing recognition of the fact that ideal working conditions offer real insurance of production efficiency and harmonious industrial relations."

Manufacturing Gained in October

MANUFACTURING activity in October, as measured by the total number of man-hours worked, increased 4.3 per cent over September, according to the National Industrial Conference Board's regular survey of wages, hours, and employment in 25 manufacturing industries.

This gain was the result of an increase of 3.1 per cent in the number of workers employed and an advance of 1.2 per cent in the average hours worked per wage earner.

Total payroll disbursements in October were 4.7 per cent higher than in the preceding month. Average hourly earnings were the same as in September, but weekly earnings increased from $25.11 to $25.50, a gain of 1.6 per cent, as a consequence of the lengthening of the work-week. Inasmuch as the cost of living declined slightly from September to October, the purchasing power of weekly earnings increased 1.7 per cent.

Pig Iron Census for 1935 Completed

THE Bureau of the Census, Department of Commerce, Washington, has published results of the 1935 census of pig iron and ferroalloys production. The number of wage earners employed in blast furnaces in 1935 was 15,021, representing an increase of 24.2 per cent over the 12,098 reported for 1933, and their total wages of $18,718,727 exceeded the 1933 figure by 61.9 per cent.

Production of pig iron and ferroalloys in 1935 amounted to 21,163,896 tons (of 2240 lb.), valued at $358,797,163 (f.o.b. furnace prices), as compared with 13,256,932 tons, valued at $204,056,320, reported for 1933 the last preceding census year. The total for 1935 is made up as follows: Pig iron and ferroalloys made in blast furnaces and consumed in steel mills and foundries under the same ownership as the blast furnaces (or under affiliated ownership), 17,543,478 tons, with an assigned value of $290,356,718; produced for sale, 3,620,418 tons, valued at $68,440,445.

Total 1935 production given above (21,163,896 tons) includes 389,241 tons of blast-furnace ferroalloys, the corresponding tonnage for 1933 being 234,021. In addition, ferroalloys are made to some extent in electric furnaces. This production in 1933 amounted to 123,155 tons. The corresponding figure for 1935 is not yet available, but will be given in the final report of the current census.

Japan Goes to Malaya For Iron Ore

THAT Malaya may replace Spain as the chief source of Japan's requirements of iron ore is indicated in a report to the Commerce Department from its Singapore office. A Japanese syndicate, it is pointed out, has just secured an option on an area in the country which is reported to be rich in iron ore. While the option has not as yet been exercised, early developments are expected in view of the Spanish situation. Japanese interests have for some time past been exploiting iron ore deposits in British Malaya on a large scale, particularly in the States of Johore, Trengganu, and Kolanuan. All of the iron mines in Malaya are at present stated to be operated by Japanese interests. Exports of iron ore from Malaya increased to 1,500,000 tons in 1935 from less than a million tons in 1932, statistics show.

SIZES from 1/2 Yd. to 12 Yds.
Operates within Headroom of Bucket

Strayer - Electrics are O.K. for any single drum crane with either A.C. or D.C. current. Just hook 'er on and let 'er dig. No skilled bucket operator needed—the skill is in the bucket—the control is in the cab. Any crane operator will make "this gang of men"—the S-E Bucket, step to his commands at any time. A hook load? Just unhook the bucket and go get it.

Write for full details.

1. Digs to full capacity at every grab.
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3. All electric control and protection.
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4. Sizes from ½ yd. to 12 yds.
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5. Guaranteed to dig more per grab than any bucket of equal weight and measured capacity.
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ERIE STEEL CONSTRUCTION CO.
Buckets *of all types* • Aggremeters • Overhead Traveling Cranes
1850 GEIST ROAD . . . . . ERIE, PA.

Steel, Electricity In Partnership

The News Bureau of the General Electric Co., Schenectady, has issued a 25-page reprint of articles which appeared in the Sept. 17 issue of THE IRON AGE dealing with steel mill electrification. The topics covered include: Superimposed turbine generators for steel plants, electrification of hot strip mill drives, electrification of cold strip mill drives, electric equipment for steel mill auxiliaries, switchgear for steel mills, electric heat-treating furnaces in steel mills, etc.

The booklet which contains many illustrations and charts is available to those interested.

African Steel Works Progressing

EVIDENCE of substantial growth in the output and profits of the South African Iron & Steel Industrial Corp. was given at a meeting of the company recently held at Pretoria. A. M. Mostert, who presided, said that the whole of the corporation's works was now in full production, the sheet works having been started up in March, 1935. The works as a whole and the separate departments are already producing at a rate well in excess of the production for which the plant was originally designed.

From the time the works were started to June 30, 1936, 434,100 tons of pig iron was produced and 437,000 tons of steel ingots. The average monthly tonnage of all products shipped from the works increased from 15,344 tons per month during the first half of 1935 to 19,746 tons per month during the second half of that year and 22,580 tons during the first six months of 1936.

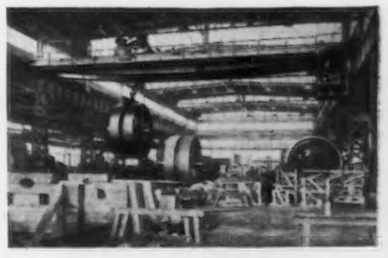
The net value of the total shipments rose from £679,000 during the first six months of 1935 to £938,000 during the second half of that year and to £1,211,000 during the first half of 1936, the total net value for the 18 months being £2,827,419 ($14,137,095).

The net value of all products shipped to customers from the time the works were started to June 30, 1936, was £3,310,588 ($16,552,940). During the year 1935, 82 per cent of the corporation's revenue came from industries, mines, and other outside customers, 15¾ per cent from the Railway Administration, and 2¼ per cent from Government departments.

Mr. Mostert showed that the manufacturing profit for the first half of this year at £249,947 was practically equal to that earned for the whole of 1935. He stated that in the second financial period after starting operations the company had entirely liquidated the loss of over £250,000 incurred during the first year of the starting up of the works, written off the outstanding item of £61,644 for interest and debentures, provided £14,160 for the redemption of debentures, and made a substantial contribution towards depreciation besides providing reserves for the relining of furnaces and for the replacement of assets having a comparatively short life.

You can be glad when there's no work for the maintenance man . . . when production's running smoothly. The less fixin' up he has to do, the better off you are. Breakdowns mean costly delays—time losses for men and machines—extra expense.

P&H cranes will ask mighty little of your maintenance department. They're designed with the liberal safety factors to meet the toughest requirements; to deliver service without interruption for years to come. This well-known reliability is the result of long experience with all sorts of material handling problems . . . of 50 years' leadership as America's largest builders of overhead handling equipment. This is the practical experience that saves you money whatever your particular handling problem may be. Write for Bulletin 131.



Electric welding of end trucks, gears, etc., gives P&H cranes still greater strength and reliability.

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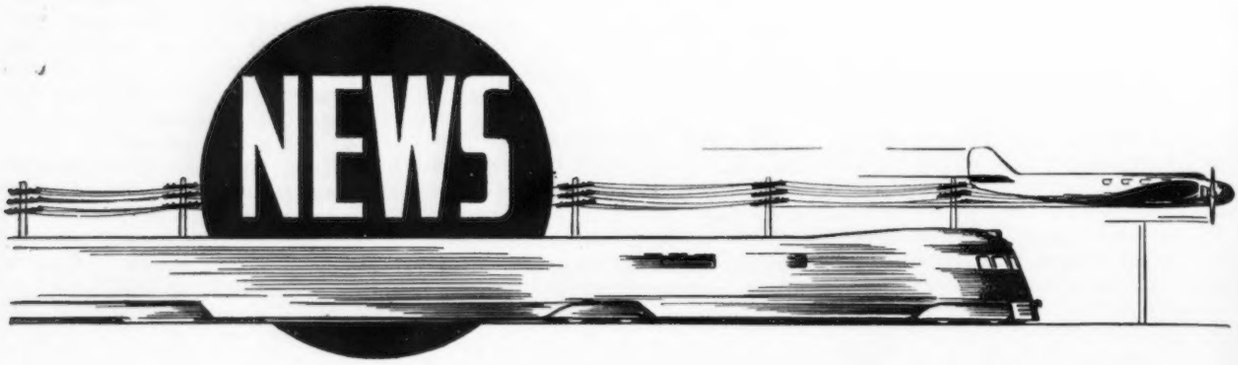

Sees Need for New Blast Furnaces

DEFERRED steel plant requirements are believed by Gordon Fox, vice-president of the Freyn Engineering Co., Chicago, to amount to several hundred millions of dollars, of which about $200,000,000 will have been spent in 1936 with approximately an equal amount scheduled for 1937. Mr. Fox made this statement, along with some other interesting comments regarding the steel industry, in an address before the Engineering Advertisers' Association on Nov. 16.

Mr. Fox drew attention to the fact that little or no new capacity in pig iron or coke has been built during the depression, while during the same period steel-making capacity has been increased by about 6,000,000 tons and 26 wide strip mills have been built or are in course of construction, with a combined capacity in excess of 11,000,000 tons annually.

"A returning demand for heavy products," said Mr. Fox, "may disturb the balance in some of our steel plants. Many of them are now operating their iron and steel producing facilities at near capacity. Therefore, additions to coke ovens, blast furnaces and open-hearth capacity would seem to be on the horizon.

"A factor which contributes to the probable need of increased pig iron producing facilities may be found in the very substantial exports of scrap during the depression years. It should perhaps be noted that in 1919 the ratio of pig iron to steel was 92 per cent. In 1933 this ratio had fallen to 58 per cent. The trend is upward, the present ratio being about 66 per cent."

Ultimate Consumer Buying More Steel

EXPANDING purchases of steel-made goods by the ultimate consumer have been an important factor in raising employment in the steel industry to the present record level, according to the American Iron and Steel Institute. The demand for lighter steels used in goods bought by individuals has been relatively steadier in recent years than that for the steels used by capital goods industries.

Since 1929 the average number of man-hours of steel mill labor necessary to produce one ton of finished steel of the kind being sold, has risen from 30 man-hours per ton to 33 last year, it is calculated from data collected by the Department of Labor on the number of man-hours required to produce the various steel products. Full-time jobs for 36,000 men were created by the 10 per cent increase in man-hours per ton, it is estimated.

Greater importance in the total output of the industry of sheet and strip steel, wire, tin plate and other highly finished products requiring more processes of manufacture is directly responsible for the increase.

Output of these products in 1929 represented only 32 per cent of the year's total production, while in 1935 the tonnage of highly finished steels was 52 per cent of the total.

About 80 per cent of the tonnage of highly finished steel products which can be traced to their uses goes into automobiles, refrigerators, household and farm equipment and other products bought by individuals.

The revival of demand in 1936 for such heavier products as rails, plates and structural shapes indicates that the average number of man-hours per ton in 1936 will be slightly below the 1935 average. At the same time, the greater demand for steels of all sorts has increased the total number of man-hours worked in the industry.

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Cataract

HARDINGE

PRECISION

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TYPICAL INSTALLATIONS OF MODERN HARDINGE BENCH MACHINES AT LEADING MANUFACTURING ORGANIZATIONS

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HARDINGE BROTHERS, INC., ELMIRA, N. Y. CHICAGO—NEW YORK DETROIT

Partool Machine Co. Plans Proceed

PARTOOL MACHINE CO., Detroit, the formation of which was recently mentioned in these columns, has selected a site for a building at 9111 Schaefer Highway, near Joy Road. The Austin Co. is the contractor. The building, of reinforced steel and brick construction with monitor roof and crane ways, will be ready for occupancy about Jan. 15 and the company hopes to get into production by Feb. 1. The company will manufacture drilling and special machinery.

Officers of the company whose names are now available are Charles E. French, president, who is also president of the Sterling-French Machinery Co.; O. A. Montgomery, secretary and treasurer; Max J. Clark, vice-president and general manager; and David Forsman, sales manager. Mr. Clark was at one time master mechanic of the Wilson Foundry & Machine Co. in Pontiac and has been connected with the Sterling-French organization since 1934. This latter company will act as the sales agent for Partool.

Lake Superior Ore Taxed 27 Per Cent

NEARLY 27c. out of every dollar paid for Lake Superior iron ore delivered at lower Great Lakes ports goes to pay the taxes levied on iron mining companies—nearly twice as much as is represented by actual costs of mining the ore, it is calculated by the American Iron and Steel Institute.

Mining costs take 15c. out of each ore dollar, of which half is paid directly to labor. Labor also gets an important part of the 42c. out of each ore dollar which goes to pay the transportation charges incurred in hauling ore by rail from the Lake Superior mines to shipping ports on the upper Lakes, and from there by water to ports on the lower Lakes.

Nine cents of the ore dollar is paid in royalties to the owners of the properties on which the mines are located.

Costs of developing the properties into mining enterprises and of marketing the extracted ore take somewhat more than 6c. out of the ore dollar.

After payment of these various charges and levies only seven-tenths of one cent remain, which represent the net profit accruing on the sale of one dollar's worth of iron ore.

$2,500,000 Order for Sugar Machinery

A $2,500,000 machinery and equipment contract has been awarded to the Fulton Iron Works Co., St. Louis, for a $4,000,000 sugar factory and refinery which the Mexican Government is building at Zacatapec, Morelos, according to F. Edward O'Neil, president. This plant is the first of four similar projects to be constructed over a two-year period, Mr. O'Neil said. He also emphasized the fact that lower bids than his were received from foreign firms, but that the Mexican authorities seemed to prefer buying from this country.

1937 Metal Congress At Atlantic City

THE 1937 Metal Congress and Exposition will be held Oct. 18 to 22, inclusive, at Atlantic City, according to an announcement by W. H. Eisenman, managing director of the Metal Show and national secretary of the American Society for Metals, which sponsors the exposition. Mr. Eisenman says that Atlantic City was selected because of its large auditorium on the Boardwalk in close proximity to the large hotels.

Leeds & Northrup Co., 4901 Stenton Avenue, Philadelphia, has opened a new branch office at 804 Judd Building, 75 Pearl Street, Hartford, Conn.

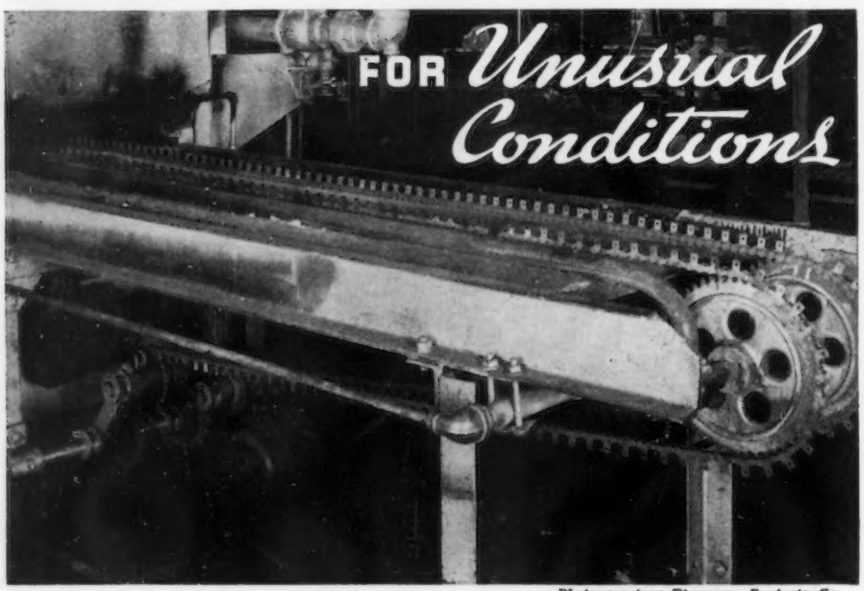

Photo courtesy Thompson Products Co.

USE ROLLER CHAIN

Baldwin-Duckworth solves another problem—this time it's heat. The conveyor illustrated, equipped with stainless steel roller chain, carries automotive parts through a normalizing furnace. Time in furnace—3 minutes at 1600° F.—20 minutes out at room temperature—and repeat—24 hours a day—day after day.

We're proud of this performance. It proves once more how Baldwin-Duckworth engineers solve problems of power transmission, elevating, and conveying. But whether the situation requires standard or special chain—with or without standard or special attachments, and regardless of the chain chosen or its cost, every part must conform to the highest standards of workmanship established by Baldwin-Duckworth. Baldwin-Duckworth Chain Corporation, Springfield, Mass.

BALDWIN—DUCKWORTH

. . PERSONALS . .

COMMODORE ALBY O. ACKARD, general superintendent of the river transportation department of the Carnegie Steel Co. and the later combined Carnegie - Illinois Steel Corp., retired from active service Dec. 1. Commodore Ackard had been a licensed river captain since 1885 and was skipper of many steamboats prior to June 25, 1917, at which time he joined the river transportation department of the old Carnegie Steel Co. as master of the steamboat Duquesne. Less than two years later he was appointed general superintendent. The title of "Commodore" was conferred upon Ackard by James A. Farrell, former president of the United States Steel Corp.

A. O. ACKARD

H. F. SHAW

Commodore Ackard's successor, HARRY F. SHAW, former assistant general superintendent of the river transportation department, will assume the title of assistant general superintendent of Clairton steel works and furnaces, in charge of river transportation. Mr. Shaw was employed as a machinist for the National Tube Co., Mesta Machine Co., McKeesport Tin Plate Co., S. Severance Mfg. Co., the by-product coke works of Carnegie Steel and the Marine Ways at the by-product plant at Clairton. In 1930 Mr. Shaw was made general foreman of the marine ways and in 1931 was promoted to superintendent in the river transportation department. He became assistant general superintendent in 1933 and by his present appointment is now in charge of all river transportation operations.

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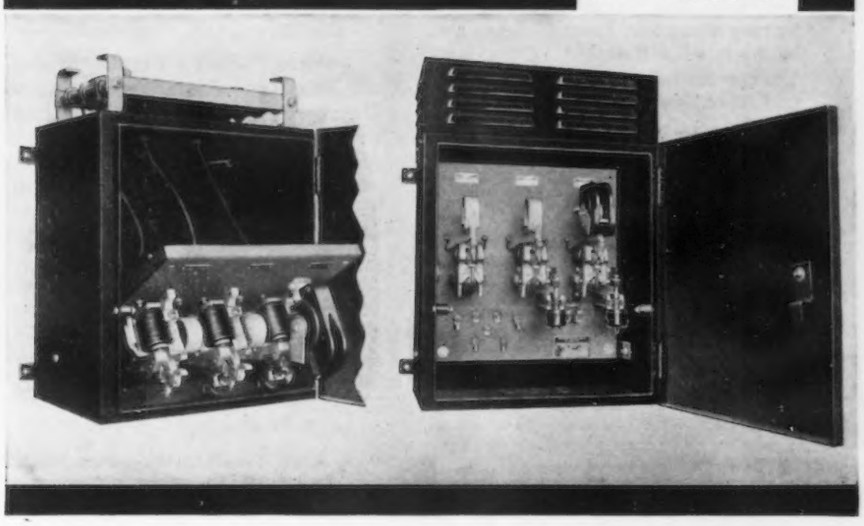
B. C. HEACOCK, president, Caterpillar Tractor Co., Peoria, Ill., has been nominated for president of the Illinois Manufacturers' Association, for 1937. Other nominations

NEW EC&M MILL TYPE D. C. STARTER

THE ELECTRIC CONTROLLER & MFG. CO. E&M CLEVELAND, OHIO

HEAVY DUTY MOTOR CONTROL FOR CRANES, MILL DRIVES AND MACHINERY • BRAKES • LIMIT STOPS • LIFTING MAGNETS AND AUTOMATIC WELD TIMERS



Now— 1 Starter for 5-25 HP, 230 Volt requirements

Designed from the viewpoint of the user, this new starter of outstanding simplicity and accessibility marks another remarkable development by EC&M. The electrical men of industry who have seen this unit have been greatly impressed by the ease with which acceleration time can be adjusted, the accessibility of this adjustment, the selection of the resistors to meet these horsepower requirements and the method of completely exposing all connections.

When used with adjustable speed motors, field acceleration, field failure relays, etc. can be made a part of this unit. Main line knife switch, overload relays and similar features can also be added where desired. Write for full details.

Compact, self-contained unit—for wall mounting.

•

Panel swings forward, making all parts accessible.

•

New Type RD Mercury-type Acceleration Relays—quickly adjustable for ½ to 2 seconds per acceleration step.

•

Reconnection of resistors only requirement to meet wide horsepower range.

•

Main Line Contactor of LINE-ARC design, giving scientific control of the arc.

The ELECTRIC CONTROLLER and MFG. CO., CLEVELAND, OHIO

are: For vice-president, J. C. BELDEN, president, Belden Mfg. Co., Chicago; second vice-president, J. E. OTIS, JR., president, Stewart-Warner Corp., Chicago; and, treasurer, PAUL SCHULZE, president, Paul Schulze Biscuit Co., Chicago. Among the nominations for directors are: S. S. EAGLE, general manager, American Car & Foundry Co., Madison, Ill.; W. HOMER HARTZ, president, Morden Frog & Crossing Works, Chicago Heights, Ill.; C. W. SENCENBAUGH, chairman of the board, Western-Austin Co., Aurora, Ill.; W. W. WILLITS, president, the Adams & Westlake Co., Chicago; and CHARLES DEERE WIMAN, president, Deere & Co., Moline, Ill.

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ANDREW JOHNSON, who has been manager of tin plate sales of National Steel Corp., has been appointed manager of the New York office, succeeding HARRY WEBER, who has resigned. Mr. Johnson was at one time located in New York as district sales manager of the Trumbull Steel Co. When that company was taken over by the former Republic Iron & Steel Co., he went with Republic in the New York sales office for a few months and then was made manager of tin plate sales of Republic, leaving that company about five years ago to take a similar position with National Steel Corp.

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EARL C. HUGHES, for the past six years assistant sales manager of the Norton Co., Worcester, Mass., has resigned to affiliate himself as secretary with the Bay State Abrasive Products Co., Westboro, Mass.

E. C. HUGHES

He has been identified with the Norton Co. in various capacities for the past 18 years.

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ARTHUR NEWELL TALBOT, professor emeritus of engineering in the University of Illinois, has been awarded the 1937 John Fritz gold medal by the four national societies of Civil, Mining and Metallurgical, Mechanical, and Electrical Engineers.

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B. HOWARD MACNEAL has been transferred from the Memphis, Tenn., office of Link-Belt Co. to its Philadelphia office, where he will specialize in the sale of crawler and locomotive cranes to industrial concerns in Philadelphia and New York office territory. E. F. CAREY, at Philadelphia, and CHESTER S. LEWIS, at New York, will continue as the company's district representatives in their respective territories, specializing in the sale of crawler shovels, draglines and cranes to all other classes of trade not covered by Mr. MacNeal.

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CLARK D. BRIDGES has been appointed director of the new Workmen's Compensation - Health and Safety Bureau of the Illinois Manufacturers' Association. He was formerly identified with the Hartford Accident & Indemnity Co. and the General Accident, Fire & Life Insurance Corp. in engineering and safety capacities.

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MORRIS LOWDER has been appointed Chicago district sales manager of the Superior Steel Corp., with offices at 122 South Michigan Boulevard, Chicago. JAMES E. CHADDERTON has been appointed Philadelphia district sales manager with offices in the Girard Trust Building, Philadelphia.

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R. H. SORGEL, who has been Milwaukee district sales engineer for the Western Bearings Co., Chicago, has been appointed sales manager, with office in Chicago. He has been identified with the anti-friction bearing field for nine years.

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GEORGE H. WEILER, heretofore identified with the Standard Steel Works Co., Burnham, Pa., has become associated, as manager of the Eastern railroad division, with the Vanadium Corp. of America. He will make his headquarters in New York. For a number of years Mr. Weiler was sales manager of the American Locomotive Co.

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LIONEL Y. GREENE has been appointed vice-president in charge of operations of the General Refractories Co., Philadelphia. RUSSELL P. HEUER has been made vice-president in charge of research, and DREW M. THORPE vice-president in charge of sales.

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H. W. SCHMID, of 1955 Ruckle Street, Indianapolis, has been appointed to represent the Ohio Electric Mfg. Co., Cleveland, in the Indianapolis territory.

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JOSEPH A. MOSKOWITZ, of Samuel Sons Iron & Steel Co., Inc., Brooklyn, N. Y., has been elected presi-

Whitey Sez:

Welding rod industry has now gone penny-pinching—coupons good for prizes, latest known method of price cutting.

Arc-Welding Electrodes

for welding all corrosion and heat resisting products. Send for data book.

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7300 UNION AVENUE · CLEVELAND OHIO

MAURATH ELECTRODES IN WORLD WIDE USE

HERMAN L. WECKLER, new vice-president and general manager of the DeSoto Motor Corp., whose appointment was announced last week.

dent of the New York chapter of the Institute of Scrap Iron and Steel. GEORGE BETTEN, of S. Betten, Inc., has been made first vice-president; CHARLES DREIFUS, of Charles Dreifus Co., second vice-president; A. SHIFFMAN, of Scrap Iron Baling Corp., secretary, and MORRIS MACKLIN, of Macklin Brothers, Inc., treasurer.

ARTHUR REICHMAN, of Reichman & Hoffman Brothers, Newark, N. J., has been elected president of the New Jersey chapter of the Institute. Other officers elected include: R. P. DELORENZO, of A. Caropreso & Co., first vice-president; ELI BUSSELL, of Plainfield Iron & Metal Co., second vice-president; ISRAEL CITRON, of Citron-Byer Co., third vice-president, and MURRAY KUMIN, secretary-treasurer.

JOHN L. YOUNG, whose appointment as manager of machinery sales for the United Engineering & Foundry Co. was announced in these columns last week.

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BEN S. MOFFATT has been appointed by Associated Industries, Cleveland, having a large membership of metal-working plants, to take charge of a program of vocational training that will be carried out by the Association with the active cooperation of members. The program provides for the establishment of apprentice and foreman training in the larger plants. Mr. Moffatt will also be a semi-official coordinator between industries and Cleveland trade schools and technical high schools. Mr. Moffatt formerly was trades and engineering director of the Caterpillar Tractor Corp. Previous to that he was engaged for 11 years in shop work as a machinist, tool maker, draftsman and plant executive in several plants. The committee of the Associated Industries, which was selected last spring to take up the matter of providing vocational training in Cleveland plants is headed by Warner Seely, secretary of Warner & Swasey Co.

Specialized to Best Serve Your Individual Requirements

Thomastrip is more than just cold rolled strip steel. This better material is specially produced for the particular requirements of individual product fabrication. In every step of production from steel analysis to final finish and shipment, Thomastrip is engineered and controlled with exacting uniformity to the best specifications for the user . . . . Greater production efficiency, better product quality, lower over-all costs are benefits you will gain by using specialized production Thomastrip. A Thomas representative will gladly cooperate in analyzing your requirements.

Send for a copy of the new Thomas Handbook of valuable information on cold rolled strip steel.

THE THOMAS STEEL COMPANY
WARREN, OHIO
Specialized Producers of Cold Rolled Strip Steel

Thomas Strip
COLD ROLLED STRIP STEEL
BRIGHT STEEL ZINC COATED
COPPER COATED

...OBITUARY...

ALBERT W. STRONG, president of the Strong-Scott Mfg. Co., Minneapolis, manufacturer of grain elevator and flour mill machinery, died in Minneapolis on Nov. 25.

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WILLIAM N. RUMELY, retired machinery dealer and farm implement manufacturer, died Nov. 25 at his home in Chicago. He was 78 years old. Mr. Rumely was formerly head of the H. Rumely Co., LaPort, Ind., and of machinery manufacturing enterprises at Hamilton, Ohio; Sycamore, Ill., and Chicago. He was a member of the American Society of Agricultural Engineers.

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DAVID S. BROOKMAN, formerly general superintendent of the Wellsville, Ohio, plant of the American Sheet & Tin Plate Co. for 30 years, died in the East Liverpool hospital on Nov. 23, following a two weeks' illness. He entered the Wellsville Sheet & Tin Plate plant as a pay clerk and remained in the plant more than 40 years, of which 35 were spent as superintendent. He retired about 20 years ago.

ALFRED F. COOKE, president of the Fawcus Machine Co. and president of the Schaffer Poidometer Co., died Nov. 27 at Pittsburgh from

A. F. COOKE

injuries resulting from an automobile accident. Mr. Cooke was a pioneer in the gear manufacturing industry, and his connection with the Fawcus company and Gears & Forgings, Inc., now the Ohio Forge & Machine Co., extended over many years. He was a member of the American Gear Manufacturers' Association almost from its beginning and served as its president in 1928 and 1929. He was active in the association's technical standardization work, serving for many years as chairman of the herringbone gear committee. Mr. Cooke was also a member of the National Metal Trades Association and was president of its Pittsburgh branch at the time of his death.

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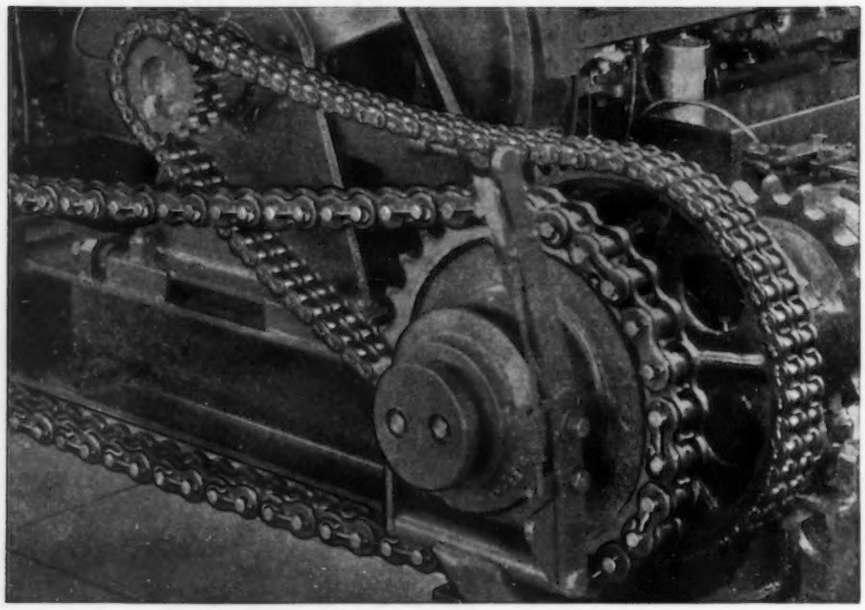
FRANK P. MCKIBBEN, noted bridge engineer and president of

FRANK P. McKIBBEN



Let Chain Drives carry the load

Write for Catalog V-115A

Whitney Chain Drives offer definite savings in power costs on plant or equipment applications. They give increased machine capacity through the maintenance of constant speeds and the positive transmission of power. They give capacity for unusual overload demands with long life and freedom from excessive maintenance costs. Let Whitney chains carry the load on your production or auxiliary drives.

The Whitney Chain & Mfg. Co., Hartford, Conn.

WHITNEY

the American Welding Society, died at his home near Fayetteville, Pa., on Nov. 27, aged 65 years. He taught engineering for more than 22 years at Massachusetts Institute of Technology, Lehigh University and Union College, Schenectady, N. Y. He was Schenectady city engineer in 1924 and 1925 and formerly was a consulting engineer for the General Electric Co.

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M. J. BAKER, for over 25 years purchasing agent of the American Well & Prospecting Co., Corsicana, Tex., died recently in that city.

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LEE B. METTLER, head of the combustion engineering company of the same name, Los Angeles, died of heart disease on Nov. 13, aged 62 years. He had been associated with the gas industry for many years.

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CARL HENRY LEIS, chief engineer and factory manager of the Johnson Bronze Co., New Castle, Pa., died at his home in that city on Nov. 15, aged 45 years. He was born in Germany and came to this country in 1917. He had been associated with the Johnson company since 1927.

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LOUIS PHILIP TOWER, president and treasurer of the Tower Iron Works, Providence, died in that city on Nov. 16, aged 67.

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INNES T. VERDIN, president of the I. T. Verdin Co., machinist, Cincinnati, died at his home in that city on Nov. 16, aged 61 years.

Mercedes Fuel Co., Edinburg, Tex., plans welded steel pipe line from connection with present main pipe line to Edinburg and vicinity, about six miles, for natural gas transmission. Cost close to $40,000.

Quartermaster, Fort Du Pont, Del., closes bids Dec. 7 for 1500 ft. of 2½-in. welded steel pipe (Proposal 270-34).

West Michigan Consumers Co., Muskegon, Mich., plans welded steel pipe line from gas field in Ravenna Township to connection with present lines at Muskegon, about 12 miles, for natural gas transmission. Cost over $75,000.

Tacoma, Wash., plans about 15,700 ft. of 24 to 35-in. steel pipe for new industrial water supply line from South Twenty-first Street to Tide Flats district; also additional distribution trunk mains, totaling about 49,800 ft. of 6 to 20-in. cast iron pipe. Fund of $866,000 is being arranged for this and other expansion and improvements in waterworks system and facilities, of which about $700,000 will be secured through Federal aid. W. A. Kunigk is city water superintendent.

Dickey Oil & Refinery Co., Wichita, Kan., has let contract for two parallel 4-in. oil pipe lines, 10 miles long, to P. H. Joseph Construction Co. One will connect with company's main line to refinery at McPherson, Kan., the other to Kansas Pipe Line Co.'s line at McPherson.

Metropolitan Utilities District, Omaha, Neb., plans purchase of 4-in. steel pipe for gas transmission in District 805. T. A. Leisen is chief engineer.

Humble Oil & Refinery Co., Humble Building, Houston, Tex., plans 10-in. welded steel pipe line from Tomball gas field, Harris County, Tex., to Houston with branch lines, same size, to Baytown, Beaumont, Port Arthur and Port Neches, Tex., about 120 miles in all, for natural gas transmission for industrial service. Steel pipe line gathering system will be installed in gas field district. Compressor plants for booster service will be built at different points along line, to develop daily capacity of 60,000,000 cu. ft. Control plants will be located in various distributing centers. Line will be built by Humble Pipe Line Co., first noted address, an affiliated organization, and is scheduled for completion early in spring. Cost close to $2,000,000.

Aberdeen, Wash., has low bids from Beall Pipe & Tank Co., Portland, for quantity of 54-in. steel pipe for submarine line in Wishkah River for industrial water supply, at $13,118.25 for pipe, and Grays Harbor Construction Co., Aberdeen, for installation, at $11,738; awards are scheduled at early date.

WYCKOFF

Industry's standard cold drawn steel specification...

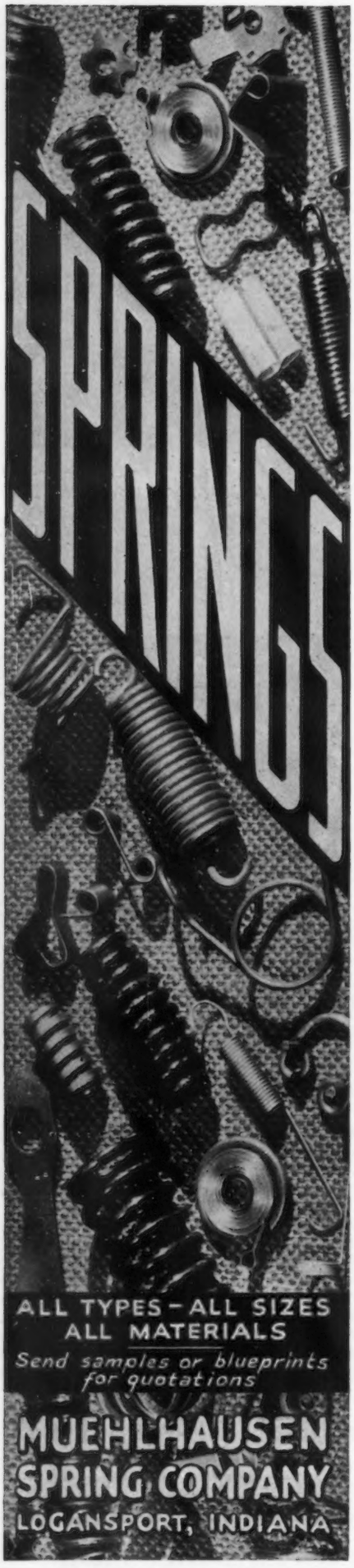
WYCKOFF

● Write Wyckoff into your cold drawn steel specification and you write your own guarantee of 100 per cent satisfaction—whether your steel requirements call for micrometric precision as to size and dimensions or whether your production demands steel of unusual physical and chemical properties or both.

● Wyckoff service is complete. Through Wyckoff counsel, perhaps your costs can be reduced or quality improved by a change in analysis. Maybe the solution lies in special cold working, the use of special shapes, a different heat treatment or a change in the set-up of automatics. In any case, we welcome the opportunity to serve you.

WYCKOFF DRAWN STEEL CO.

General Offices: First National Bank Bldg., Pittsburgh, Pa.
Mills at Ambridge, Pa. and Chicago, Ill.
Manufacturers of Carbon and Alloy Steels
Turned and Polished Shafting Turned and Ground Shafting



Lewis Union Groups Charge U. S. Steel with "Unfair Labor Practices"

THE Amalgamated Association of Iron, Steel and Tin Workers and the Steel Workers' Organizing Committee backed by John L. Lewis' Committee on Industrial Organization, have filed charges of unfair labor practices against the United States Steel Corp. and its largest subsidiary, Carnegie-Illinois Steel Corp. These charges have been filed with the National Labor Relations Board at its regional office at Pittsburgh and involve alleged domination of the steel company in activities of the plan of employee representation at several plants. Another charge alleges company coercion in the employees' right of self organization.

The alleged domination of employee representatives as outlined in the charge takes a form of financial assistance in defraying administrative expenses of the company unions and the alleged coercion is supposed to have taken place in the securing of signatures to the cost-of-living wage scale agreement.

A spokesman for the Carnegie-Illinois Steel Corp. has flatly denied these allegations. Discussing the S.W.O.C. charges informally, the Carnegie-Illinois spokesman said: "Amendments intended to make the employee representation plan conform to the National Labor Relations act were approved by a majority of our employees at a special election held in February, 1934. . . . As recently as June, 1936, the Gary tin mill workers voted 2518 to 510 for the continuance of the plan as the best method of collective bargaining with management. Included in the plan which the workmen have indorsed is a provision that the corporation shall pay the expenses connected with the representatives meeting. Our workmen are free to hold plant meetings to express their desires, they are free to attend meetings of employee representatives, they have held and can hold special referendums as at the New Castle-Shenango works where 3600 men, polled by their own representatives, recently approved the company's wage agreement. Furthermore, employees have the exclusive right to abolish the employee representatives plan, provided the majority believe it is an unfair labor agreement, unfairly conducted, as charged."

Meanwhile, 34 leaders from the Carnegie-Illinois Steel Corp.'s plants in this district are meeting this week in Pittsburgh to perfect the plan under which the company bargains with its employees. A strongly worded defense of the employee representatives plan is expected to result from this meeting and a move to oust Elmer J. Maloy, pro-Lewis chairman of the representatives central committee, was considered a possibility at the meeting attended by the 18 employee representatives.

Attempts by the employee representatives of the Jones & Laughlin Steel Corp. to have management recognize a central bargaining committee, which would deal with the head of the company, have been unsuccessful. The company's attitude is that the mill superintendents have been granted increased power to deal with the employees' requests and therefore there is no necessity for a central committee.

. . TRADE NOTES . .

Haven Co., 530 West Lapham Street, Milwaukee, established in 1931 to manufacture milk cooling apparatus, has merged with Babson Brothers, Chicago, manufacturers of milking machines, and transferred its shop and office to Babson plant on Nov. 1.

Serrick Corp., Defiance, Ohio, has been organized to combine the Defiance Screw Machine Products Co., Defiance, and the Acme Machine Products Co., Muncie, Ind. L. F. Serrick, who has been president of the Defiance company, will be at the head of the new company.

Link-Belt Co., Chicago, has appointed P. B. Engstrom authorized distributer for crawler shovels, draglines and cranes, also locomotive cranes in Los Angeles and southern California. His headquarters will be at 361 S. Anderson Street, Los Angeles.

Shafer Bearing Corp. has moved its general offices to 35 E. Wacker Drive, Chicago.

McQuay-Norris Mfg. Co., St. Louis, has voted to liquidate two wholly owned subsidiaries, the McQuay-Norris Mfg. Co. of Indiana, Inc., and the McQuay-Norris Bearings Co., which after Jan. 1 will operate as divisions of the parent company.

Republic Steel Corp. Announces Several Operating Division Changes

HARRY H. HOLLOWAY, general superintendent of the Newton Steel Co. plant at Monroe, Mich., has been transferred to Cleveland to become assistant manager of the Cleveland district of the Republic Steel Corp. under HOWARD B. CARPENTER, Cleveland district manager. JOHN W. HUGHES, who has been superintendent of the hot strip department in Warren, Ohio, has been transferred to Cleveland to take charge of the continuous strip mill which Republic will build in that city. JAMES J. BOWDEN, formerly assistant superintendent of the sheet and tin mill department of the Warren district, has been made chief metallurgist of the Cleveland district. BERT KENNEDY will be assistant chief metallurgist. Mr. Hughes will be succeeded in Warren by RAYMOND C. GINTERT, assistant superintendent of the Warren hot strip mills.

Mr. Holloway started with the American Sheet & Tin Plate Co. in 1909, and during the past 27 years has been associated successively with the LaBelle Iron works, Steubenville, as night superintendent; DeForest Sheet & Tin Plate Co., Niles; Brier Hill Steel Co., Youngstown; in charge of the Republic sheet mills in Niles; in both the production and sales departments of the Sharon Steel Hoop Co., and with the Apollo Steel Co., where he was assistant to the president.

Mr. Hughes became associated with the Warren plant of Republic Steel Co. in 1913 and in 1929 was made superintendent of the hot strip finishing department. During the past four years he has been superintendent of all the hot strip departments.

Mr. Bowden served as metallurgist for the Colonial Steel Co. and the Laclede Steel Co., and with the sales department of the Wheeling Steel Corp. Later he became assistant chief metallurgist of the American Rolling Mill Co. at Butler, Pa., and in 1928 went with Republic as chief metallurgist for the Warren district and chief inspector. In 1936 he became assistant superintendent of the sheet and tin department.

B. R. RICHARDSON, formerly superintendent of the Enduro sheet and strip divisions of Republic Steel Corp., has been made superintendent of the United steel division, Canton. He will be succeeded by JAMES G. DAVEY, superintendent of the Canton Tin Plate Co., a Republic Steel subsidiary. Mr. Richardson started with the American Sheet & Tin Plate Co., Gary, Ind., in 1919 and later was in the inspection department of the Indiana Rolling Mill Co., and rougher in the sheet mills of the Mansfield Sheet & Tin Plate Co. In 1921 he became associated with the Central Steel Co. at Massillon, and the next year went to the South division of the United Alloy Steel Co., where he held various positions until he reached the superintendency. In 1935 he was made superintendent of the Enduro sheet and strip divisions of Republic.

Mr. Davey held various positions in the sheet mills of the Massillon Rolling Mill Co., which was founded by his father and older brothers. In 1914 he went to the Mansfield Sheet & Tin Plate Co., where he was employed successively as superintendent of the hot mills and superintendent of the finishing mills. After the merger of the company to form the Empire Steel Co., he had charge of the Philadelphia district sales office and later became general superintendent of the company's Niles and Ashtabula plants. With the organization of the Canton Tin Plate Co. in 1930 he was made superintendent, and after this company was taken over by Republic he continued as assistant superintendent.

IN a proposed report yesterday John Davey, examiner for the Interstate Commerce Commission, held that a reasonable freight rate on scrap iron in carloads from Zanesville, Ohio, to Nicetown and Midvale-Nicetown, Pa., is $5.49 per gross ton. He recommended award of reparation to the complainant, the Midvale Co., equal to the difference between the rate he established and the rate of $6.60 which was originally charged on shipments.

SHEPARD NILES

DIRECT WORM DRIVE

Electric Hoists

1/4 TO 6 TONS CAPACITY

CLOSE HEADROOM, AUTOMATIC LUBRICATION, ROPE OR PUSH BUTTON CONTROL, ANTI-FRICTION BEARINGS

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MOST COMPREHENSIVE LINE OF CRANES & HOISTS

Salesmen and Advertising

There are 16 ways that advertising helps salesmen to sell more goods at less expense: advertising and salesmen are not competitors—they are a team.

° ° °

By JOHN ALLEN MURPHY

° ° °

THERE seems to be much misunderstanding about the relationship that exists between salesmen and advertising. The feeling is altogether too prevalent that salesmen and advertising are competitors, and that both are aiming at the same objective—the sale of goods.

Too often manufacturers feel that when they have salesmen and also advertise, that they are using duplicate selling instrumentalities, and, therefore, are wasting money in unnecessary sales effort. Salesmen, on the other hand, frequently regard advertising as a rival. They think it is a reflection on their ability, an indication that their employer hasn't full confidence in them and is using advertising to show them up. How many times have we heard salesmen say, "Give that advertising money to me in larger commissions and I'll produce more business in a year than advertising could in ten." Or "Use that advertising money to lower prices and watch business boom." Or "Let's spend that advertising appropriation in entertaining our prospects and we'll show that entertaining is more profitable than advertising."

The steel business and in fact the entire metal goods industries, is an acute sufferer from this attitude toward advertising, on the part of both manufacturers and their salesmen.

That there is this misunderstanding as to the true function of advertising is one reason why so many companies don't succeed with it as they should. With management trying to use advertising to accomplish a job for which it is not fitted and with salesmen bucking the advertising, or at least not properly supporting it, no wonder that advertising is often so grievously handicapped. And what is even worse, where such an attitude exists toward advertising, similar misapprehensions are likely to be held as to the work of salesmen.

So let us clear up this misunderstanding. We cannot be too emphatic in stating that advertising and salesmen do not compete. They have entirely different jobs to perform. Advertising as most successful advertisers in the industrial field are using it today is not intended to sell goods directly. It is designed to help the salesmen to sell. Therefore, instead of being their competitor, it is their ally and co-worker.

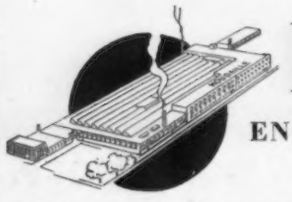
Part of the Sales Program

Advertising as metal manufacturers are using it, or at least should be using it, is part of the sales promotion program. It is not a direct selling activity at all. It is an auxiliary activity, as is all sales promotion. Its purpose is to clear away the underbrush in the salesman's path, to make his traveling easier, to break down the sales resistance that he would otherwise have to meet, to educate the market, build prestige for the line he is selling, etc. Advertising lightens the salesman's work in every particular. It enables him to do creative selling, to get out of the rut of competition and to build his business on a higher plane. Above everything else advertising saves the salesman's time, and gives him an opportunity to devote all his efforts to his main job, which is selling, and to forget the 101 other things which without advertising salesmen are asked to do.

It has been found, especially in industrial marketing, that advertising is most effective when it teams with salesmen. The best marketing formula today is one composed of smooth cooperation among advertising, salesmen, wholesale distributors, retailers and other units in the channels of distribution. The single-factor, or one-idea, plan of marketing is usually too handicapped to produce profitable results.

CERTAIN manufacturers have discovered that, despite their huge facilities, Houdaille can produce certain parts or assemblies for them with infinitely greater precision and *at lower cost* than their own facilities permit.

The reason is that over a period of years Houdaille has built up greater batteries of the finest and most modern precision machining equipment in the country—has trained carefully chosen experts to operate it—has developed a staff of design and production engineers to collaborate intelligently with manufacturers.



HOUDE

ENGINEERING CORPORATION

BUFFALO, N. Y.

A DIVISION OF HOUDAILLE-HERSHEY CORPORATION

This is a comparatively new conception of advertising. Not so many years ago advertising was regarded as capable of playing a lone hand. And it did play it with notable success in many instances. There are any number of businesses that were built largely through advertising. Most of these advertisers, of course, were in the drug, toilet goods, small specialty and mail order fields. These manufacturers discovered that by advertising they could either sell the consumer direct or that the pressure of consumer demand would pull the product through the channels of distribution, foreign jobbers and retailers to carry the thing advertised. Many of these concerns got along without salesmen entirely or employed only a couple of men to call on wholesalers.

In this period the sales organization as we know it today did not exist. Generally speaking, the advertising manager was more important than the sales manager. In fact, few companies had sales managers. The handling of sales, such as it was, usually fell to the boss, himself. He even did most of the selling.

Changing Situation

But all this has been changed. Many causes contributed to the change. The great increase in the number of advertisers, with the resulting competition among them, cut down the direct returns from advertising. Also the country's distributing system became more efficient. Mass production was followed by mass distribution, through chain stores and in other ways. It became easier for the consumer to buy at home. Advertising gradually became an aid toward getting people to buy instead of being the sole influence as it once was.

However, the biggest reason for the change is that manufacturers found the newer type of sales organization, with its network of inter-related selling and promotional activities, to be a more satisfactory method of producing business in profitable volume. With this discovery the old-fashioned, one-way plan of selling began to disappear. The mail order houses added a string of retail stores to their marketing setup. Specialty mail order sellers sought retail distribution in many instances. The Fuller-brush-system came into being, where salesmen, usually flanked by advertising, solicited business directly in the buyer's home. Manufacturers in all lines determined to use all of the selling instrumentalities available—advertising, salesmen, distributers and anything or anybody willing to lend a hand to increase volume and lower selling expense.

In the old days when advertising was regarded as paramount to selling in many quarters, we heard a lot about consumer demand. We thought advertising was able to sell people so hard that they would force the trade to stock the thing advertised. Now we know better. There are not a dozen advertising appropriations large enough to create consumer demand.

Buyer Acceptance

However, the number of appropriations that are large enough to create buyer acceptance would run into the thousands. Today, with advertising and salesmen working hand-in-hand with all the other agencies of distribution, almost any appropriation is large enough to accomplish its objective if the campaign is well planned. A little advertising will go a long way if it is properly backed up by the sales department.

A striking example of the change that has come into things can be found in the history of the Gordon Van Tine Company. This Iowa concern sells building materials and allied products, and used to be an exclusive mail order house. It still sells by mail, but its principal marketing channel is through salesmen, who call directly on the buyer. These men comb the grass-roots regions. They are backed up with publicity advertising. Its object is to keep the name Gordon-Van Tine before the people on whom the salesmen are calling. This overcomes resistance and makes the work of the salesmen easier and more productive.

The significant point about this development is that formerly Gordon Van Tine's advertising was pure mail order copy. It sought orders and got them, as the company's success over a number of years attests. In fact, that is the way all mail order concerns operated. Their advertising and their direct literature had to bring back the bacon or they would have to put up the shutters. With rural routes being canvassed door-to-door by oil companies selling tractor oil, roofing companies, mill work companies, harness factories and everybody else, what chance has advertising to compete? Let us concede that on a matter of straight selling advertising cannot compete with salesmen. But it can help the salesmen to get more orders and to get them at a lower selling cost.

Industrial Selling

If this is true in consumer selling, how much more true it is of industrial selling. To gain buyer acceptance is the aim of most industrial advertising. Seldom is an industrial advertisement designed to bring back orders. Nearly always its object is to help a salesman or a distributer or a fabricator to get the order. The advertising introduces him and the

Industrial Perforations include such sizes and shapes as are used in the mechanical arts. Our line is very comprehensive.

Ornamental Perforations are used in Architectural Grilles, Metal Furniture, Radiator Enclosures, Air Conditioning, Stoves, etc. We have many attractive and exclusive patterns. H&K workmanship is unsurpassed.

ANY METAL
ANY PERFORATION

The Harrington & King PERFORATING Co.

5657 FILLMORE ST., CHICAGO - 114 LIBERTY ST., NEW YORK

manufacturer he represents, it paves the way for him and thus simplifies and shortens his job.

In selling alloys, for example, to fields that have not used them before, it is necessary for the mill to do a lot of educational work before it can expect to do much business. The question arises whether it is best to conduct this educational campaign through salesmen or through advertising. If it is done through salesmen, the job will drag along eternally. It will be prohibitively expensive. And, alas, it will be ineffective. Salesmen are not qualified by experience, training or temperament to engage in educational work. Anyway, why do a job by hand that can be done infinitely better and incomparably faster with an automatic, speed machine?

Advertising is such a machine. With it, thousands can be reached quickly and tellingly while salesmen are haltingly reaching only a few. Obviously, educational work should be done through advertising, and that is the way it is being done by all concerns that are not still lumbering along in the ox-cart era.

As a matter of fact the most successful marketers of alloys do use advertising to do their educational missionary work. Their formula for getting into a new field is research plus advertising plus salesmen. A market analysis is first made to get all of the basic information about the prospective field. Is it a large enough market potentially to justify cultivation? What materials are the users in this field employing them? Are they satisfied? If not, why not? Can our alloy overcome the difficulties being experienced with the materials now in use? What are the channels of distribution in that trade through which we will have to market our product. What prices now being paid? What quantities being purchased? The answers to many similar questions will have to be found.

When they are found and if the analysis shows that the prospective market is worth going after, the next step is to start the advertising. This should be straight educational stuff, telling all about the material being offered. Recount the advantages it has over the product now being used, but do this without making invidious comparisons. Relate the experiences of manufacturers in allied fields with the material.

The third step in the campaign is to start the salesmen soliciting orders. Whether they start concurrently with the advertising is a matter of choice. They will make greater headway if the advertising precedes them for a few months, and thus has had time to break down the prejudice and apathy toward a new product which exists in every field. Most manufacturers are too impatient to let their advertising get in this advance work. Usually they send the salesmen into the new industry immediately, and expect them to produce business before the advertising has had time to prepare the way for them. This is the principal reason why campaigns introducing new products often fumble at the outset.

After the educational effort has been successful, and the salesmen are selling in satisfactory volume, the tone of the advertising can be changed somewhat. It can be less educational and can properly take a specific turn. Instead of telling what the material has done in other lines, it can tell definitely what it *is* doing for the field in question. The salesmen will continue to need the assistance of some sort of advertising permanently.

Perhaps the greatest service advertising renders salesmen is in saving their time. On the average, salesmen spend only from 300 to 600 hours a year in the presence of actual buyers. This means that a salesman puts in only an hour or two a day in actual selling. This is a liberal estimate at that. So much time is wasted in waiting at buyers' offices, in traveling, in cultivating subordinates who wield buying influence, but have no buying power and in doing the 101 odd jobs that salesmen have to do that a salesman is lucky if he gets a chance to put in an hour or two a day before real buyers.

Advertising helps to alleviate this condition because it enables a salesman to concentrate on selling. He can use that precious hour or two in bearing down on buyers and getting their signatures on dotted lines. If a salesman is well represented in advance by advertising, he can get in to the buyer quicker, he does not have to take much time in explaining who he is and in telling about what he is selling. He can get right down to business.

Another important function of advertising is to reach brass-hats behind the scenes who often have decisive influence in swinging sales, and yet they cannot be reached directly by salesmen. Frequently, these men are directors or large stockholders who may not be located in the buying organization. In many cases their very existence may not be known to salesmen. Advertising succeeds in penerating the walls that bar these influential persons from salesmen.

Cultivation

In analyzing salesmen's reports it is surprising how often one finds this explanation as to why an order was not obtained, "New man with the company. Is not familiar with our line. Will need a lot of cultivation." Advertising is the best way to cultivate these people. Business is really a parade. Its personnel is ever moving, both forward and backward, getting pro-

WOOD MEETS METAL

If you require other finished products made from Native hardwoods such as Maple, Beech, Hickory, Cherry, Chestnut, Ash, etc. — let us quote on your requirements.

And one of the toughest spots where this occurs is on a drop hammer. Here the wood must be of the toughest variety if drop forge hammer-men are to keep their hammers in productive time instead of frequent "time out" for board replacement.

"Durock" and "Silveroc" Hammer Boards have demonstrated their ability to take it. "Durock" is a tough, pliable, straight-grained Pennsylvania Rock Maple thoroughly seasoned and scientifically cut. "Silveroc" is treated to give extra service.

Try "Durock" or "Silveroc" on your next purchase of hammer boards!

H.G. IRWIN LUMBER CO. ERIE, PA.

DUROCK

TRADE MARK

moted, getting fired, going with other companies, retiring, dying, etc. The personnel of any customer or prospect does not remain the same very long.

It is advertising's job to keep the manufacturer's stay before this parade continually. The salesman cannot do it. It is his function to get orders from individual units in this parade. He won't succeed in doing this unless advertising has been everlastingly doing its missionary work on the entire parade.

In fact, advertising's greatest power is its peculiar ability to keep knocking at thousands of prospects' doors at once, whereas salesmen can knock at only one door at a time.

It would seem, therefore, that the benefits that salesmen derive from advertising are numerous. The difficulty, in many cases, is to get salesmen to appreciate that this is true. Notwithstanding this, most successful advertisers have found that there are a number of ways that they can sell the advertising to the salesmen.

One of the most effective ways to convince salesmen that the company's advertising is helping them is to send them inquiries that the advertising produced. The inquiries brought in is a poor way to judge advertising. Some of the most profitable campaigns are not planned to bring in inquiries. Nevertheless, the inquiry has a legitimate plan at a certain stage in an industrial advertising campaign. Properly handled inquiries are likely to enthuse the salesmen about the advertising. Some advertisers deliberately seek inquiries for no other purpose than to impress their salesmen that their advertising is read. Usually, it is necessary to do this for only a short while.

Sixteen Ways That Advertising Helps

One of the larger steel companies uses an original method of acquainting its salesmen with what it is doing advertisingly. A folder is sent out periodically to all salesmen, containing proofs of the current advertisements. This lets the salesmen see the extent of the company's advertising, it lets them know in what fields advertising is being done and what the copy appeal is in each. It informs the salesmen as to new products or services their employer is offering. It familiarizes them with new sales arguments that are being used. It tells of interesting installations that are occasionally described in the advertising. This portfolio of advertisements not only stimulates the salesmen, but it furnishes them with an abundance of good selling ammunition.

To sum up, there are 16 ways that advertising helps salesmen:

(1) It keeps them from doing chore duty, and enables them to concentrate on their principal job which is to sell.

(2) It paves the way for the salesmen, introduces them to their prospects and breaks down the resistance which, without it, they would have to overcome before they could do any selling.

(3) It announces new products, additions to line, improvements in old products, etc., and thus makes it easier for the salesman to sell these things when he reaches the buyer.

(4) It reaches the man with buying influence, even though he be completely concealed behind the scenes and inaccessible to salesmen. Advertising wins the support of these hidden factors for the salesmen.

(5) It reaches prospects steadily and consistently and delivers its message regularly whereas salesmen can call only occasionally.

(6) It reaches thousands of prospects at a time, whereas salesmen can call on only one at a time.

(7) It keeps the salesman and his house and his proposition before prospects when he is traveling elsewhere.

(8) It reaches the buying parade —ferreting out, educating and delivering a message to new buyers, who superseded buyers calling on, and who may have died, retired, been promoted or fired and are no longer in the parade the salesman is covering.

(9) It is a liaison influence that establishes teamwork between the salesmen and the other factors in the distribution set-up.

(10) It has demonstrated that one-idea selling systems are not so profitable, as where all factors in the scheme of distribution cooperate to help one another.

(11) It helps salesmen to get more orders and to get them at a lower selling cost.

(12) It does the educational job which every seller must do at some stage of his campaign and for which salesmen are not qualified to do.

(13) It does scouting work for salesmen, sifting the real prospects from the curiosity seekers.

(14) Industrial advertising, in particular, is designed to gain buyer acceptance and thus to help the salesmen get the order, instead of going after the order itself.

(15) Advertising and salesmen complement each other. Each is handicapped without the other.

(16) Above everything else advertising saves the salesman's time and conserves his energies.

..GREAT BRITAIN..

...Pig iron prices advanced 6s. per ton.

o o o

...Little iron available as output is well sold ahead.

LONDON, Dec. 1 (*By Cable*).—British pig iron prices have been advanced 6s. per ton, but the increase will have little immediate effect as the output is sold up for months ahead and the tight position of the supply prevents new business. More blast furnaces have been lighted, but the additional output is required to supplement deliveries and will not greatly relieve the market shortage. Steel business is still increasing and the price tendency is firm.

Large imports of semi-finished steel in excess of the quota are necessary. Constructional engineers are particularly disturbed by late deliveries. The motor trade is using large quantities of sheets and strip. Export sales are necessarily neglected. The House of Commons passed the new import duties provided for in the agreement with the Continental Steel Cartel.

Large business in tin plate continues at 6p. to 1s. over the official minimum prices and unfilled orders are at the highest level in years. Output is at 65 per cent of capacity, but increased percentage allotment may be necessary if the demand is sustained.

Continental producers are doing a good business in nearly all export markets. Some business has been lost owing to the impossibility of reasonably early delivery.

British and Continental tube makers have reached an agreement in principle on export prices and further meetings will settle details.

Continental gold prices remain unchanged. British prices, except on pig iron, also remain unchanged.

Would Build Largest Streamlined Trains

TWO new light-weight streamline trains, which will be the largest and most powerful in the world, are to be built immediately by the Pullman-Standard Car Mfg. Co., according to a joint announcement made Wednesday by the Southern Pacific, Chicago & North Western and Union Pacific railroads. The new trains, which will cost an aggregate of about $3,000,000 will be named City of Los Angeles and City of San Francisco and will replace those streamline trains of the same name which are now in service.

Each train will be made up of 17 cars, including three power cars, and will be 1250 ft. long. Each will be wider than the present standard equipment and will have a capacity nearly 50 per cent greater than the trains they will replace.

The three power cars will measure in length a total of 209 ft. and each will contain two 900 hp. diesel engines directly connected to generators providing electrical power for the traction motors. The multiple control of the power plant, centering in the cab of the forward car, is designed so the engines of any one car may be operated independently or in series with either or both of the other cars. The three power cars together will furnish 5400 hp., said to be the largest diesel-electric unit ever used on a passenger train. A fourth car will house auxiliary diesel units, for air-conditioning and lighting the coaches. Every car on the train will be air conditioned, with individual heat control in every room of every car. Electric outlets for toilet articles, razors, curling irons, etc., will be available in all dressing rooms.

According to a joint statement issued by A. D. McDonald, Fred W. Sargent and Carl R. Gray, presidents of the Southern Pacific, Chicago & North Western and Union Pacific respectively, "The new trains . . . will have more commodious lounge accommodations, the berths in all cars will be wider and longer than those on conventional equipment, the dining facilities will involve a new type of construction and service. In the Pullman equipment, for example, there will be a duplex bedroom car in each train, a new development in sleeping car equipment. The Pullman accommodations will include sections, compartments, drawing rooms and individual and double bedrooms."

The trains are expected to go into service early in 1937, and will run between Chicago and the Pacific Coast in 39¾ hr. The total capacity of the City of San Francisco will be 228 made up of 174 Pullman passengers and 54 coach passengers. The City of Los Angeles will have accommodations for 150 Pullman and 104 coach passengers, a total of 254.

★

Specialists in Alloy and Tool Steel TUBING

Our concentration on tubing enables us to give customers the benefit of our special skill and experience. Large stocks available for immediate shipment—Tool Steel Tubing, Ball Bearing Tubing, Stainless Tubing, Aircraft Tubing, Hypodermic Tubing, Cold Drawn Mechanical Tubing, A.S.M.E. Boiler Tubing.

May We Serve You?

THE BISSETT STEEL COMPANY, Cleveland, O.

The Tubing Specialists

Pig Iron Production in November Rose 3 Per Cent Over October

ESTIMATED production of coke pig iron in November totaled 2,993,434 gross tons, compared with 2,991,887 tons in October. The daily rate in November, at 99,781 tons, was 3.3 per cent above the 96,512 tons in October. There was a gain of three furnaces, 164 being in blast on Dec. 1, against 161 on Nov. 1.

Among the furnaces blown in during the month were: One Midland, Pittsburgh Crucible Steel Co.; one Cambria, Bethlehem Steel Co.; one Gary, Carnegie-Illinois Steel Corp.; one Duluth, American Steel & Wire Co.; one Ensley, Tennessee Coal, Iron & Railroad Co., and one North Birmingham, Sloss-Sheffield Steel & Iron Co.

Furnaces blown out or banked included the Troy furnace, of the Troy Furnace Corp.; one Mystic Iron Works Furnace, and one River furnace, of Republic Steel Corp.

Actual production figures and complete tabulations will be published next week.

British Steel Merchants Eliminated

DURING the past few years there has been a definite disposition on the part of British iron and steel manufacturers to dispense with the services of distributive merchants. Wherever possible, direct contact between producer and consumer is being established. The development of the operations of the industry under the system of tariffs, and, later, the agreement with the European cartel, has made the exclusion of the merchant easier.

In the establishment of the new commercial organization of the iron and steel industry, merchants fear that there is a danger of their services being eliminated to the ultimate detriment of the industry itself. Under present prosperous conditions, manufacturers can easily find an outlet for the whole of their production, but it is not expected that these conditions will continue indefinitely.

The necessity for reorganization of the iron and steel industry is admitted, but it is felt by merchants that it could advantageously be carried through on lines which would preserve the function of the merchant in the distributive side of the industry. The merchants have therefore made application to the Import Duties Advisory Committee, through the Iron, Steel, Tinplate, and Metal Merchants' Section of the London Chamber of Commerce, that the commercial side of the industry should be given careful consideration in the examination of the industry which the committee is now conducting.

Abrasive Grain Size Booklet Available

THE Division of Simplified Practice of the National Bureau of Standards has announced that printed copies of simplified practice recommendation R118-36 on abrasive grain sizes are now available. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, for 5c. each.

This simplified practice recommendation, which originally became effective Sept. 1, 1930, establishes a table of allowable limits for the sizing of aluminum oxide and silicon carbide abrasives for polishing uses and for grinding wheel manufacture.

The revision does not change the recommended sizes. However, it clarifies the headings and the example which is given to explain the use of the recommendation.

This recommendation is effective from Sept. 1, 1936, and is subject to regular review by a standing committee of the industry.

October Railroad Income Higher

ADVANCE reports from 130 Class I railroads, representing 98.4 per cent of total operating revenues, made public on Monday by the Association of American Railroads, show that those roads in October had a net railway operating income of $88,477,459, compared with $74,043,657 in the same month last year. Complete reports for all Class I railroads as to their revenues and expenses in October are expected to be available within a few days.

Taxes paid in October by these railroads amounted to $28,059,395 compared with $21,312,148 in October, 1935, or an increase of 31.7 per cent.

Do YOU know the Answers?

Count 20 points each for the correct answers to the following questions. Can you score 80? Don't look now, but the answers are on page 169.

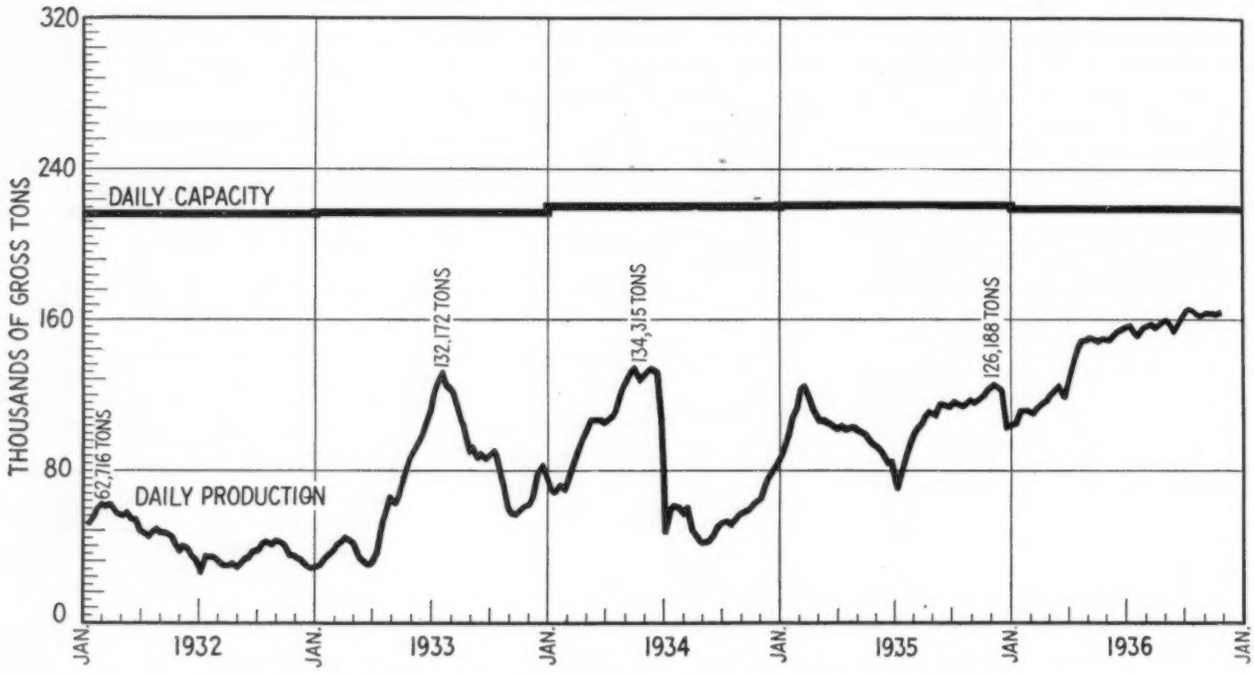
1. Of the following football teams only one ever played in a "Tournament of Roses" game:
   Carnegie Tech — Minnesota
   Michigan — New York University
   Princeton — Texas Christian
2. The historic cup for which professional hockey teams compete is called:
   The Walker Cup — The Davis Cup
   The Stanley Cup — The Standish Cup
   The Ryder Cup
3. Of course, everybody knows that the oldest city in the U. S. is:
   New York City — Philadelphia, Pa.
   Providence, R. I. — St. Augustine, Fla.
4. Although the Panama Canal belongs to the U.S., its construction was begun by:
   England — Mexico
   Spain — France
   Germany
5. What brand of automotive tubing can be heat-treated without injury?

The Answer to Your Tubing Problem is
BUNDY TUBING
BUNDY TUBING CO. . . DETROIT

STEEL INGOT PRODUCTION

Daily Tonnage of Bessemer and Open-Hearth Steel Ingots Produced by Weeks, 1932-1936

Current Week	Last Week	Weeks Ended Dec. 7, 1935	Dec. 8, 1934	Dec. 9, 1933	Dec. 10, 1932
166,799	163,507	126,188	64,956	62,836	34,602



Figures for the current week are not indicated on the chart until the following week.

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

District	Current Week	Last Week	Weeks Ended Nov. 7, 1936	Dec. 7, 1935	Dec. 8, 1934
Pittsburgh	72.0	71.0	71.0	44.0	19.0
Chicago	77.0	77.0	76.0	63.5	34.0
Valleys	78.0	74.0	75.0	60.0	34.0
Philadelphia	54.5	54.5	55.5	41.0	24.0
Cleveland	76.0	78.0	84.0	82.0	41.0
Buffalo	84.0	84.0	84.0	42.0	24.0
Wheeling	94.0	86.0	93.0	80.0	55.0
Southern	69.5	69.5	65.0	50.0	21.0
Ohio River	95.0	95.0	88.0	85.0	35.0
Western	59.0	59.0	59.0	40.0	15.0
St. Louis	69.0	72.0	69.0	64.0	25.0
Detroit	100.0	100.0	100.0	95.0	48.0
Eastern	85.0	85.0	90.0	40.0	25.0
Aggregate	76.0	74.5	74.5	57.0	29.5
Average Year to Date	66.3	66.3	65.7	47.9	37.3

Weekly Booking of Construction Steel

From THE IRON AGE

	Week Ended Dec. 1, 1936	Nov. 24, 1936	Nov. 2, 1936	Dec. 3, 1935	Year to Date 1936	1935
Fabricated structural steel awards	25,210	18,365	15,850	16,425	973,005	728,515
Fabricated plate awards	415	1,390	1,110	3,400	194,665	136,550
Steel sheet piling awards	1,195	400	1,875	5,640	53,960	63,525
Reinforcing bar awards	4,200	8,140	2,625	3,625	314,840	290,790
Total Lettings of Construction Steel	31,020	28,295	21,460	29,090	1,536,470	1,219,380

. . . .SUMMARY OF THE WEEK. . . .

. . . Heavy buying fills mill schedules for December on some products.

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. . . Railroad buying of rails, track supplies and equipment in unusual volume.

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. . . Labor troubles in automobile industry only blot on exceptional steel outlook.

A FLOOD of steel and railroad equipment buying that preceded the effective date, Dec. 1, of price advances on various steel products has virtually filled up mill schedules for December, with a considerable overflow into January, and has created conditions that seldom have been seen in the steel industry except in such unusual years as 1920 and 1929.

Steel ingot output has risen to 76 per cent, a new peak for the year, and may go higher this month, scrap markets are reviving from a slump of several weeks and scrap prices are pointing upward, an Eastern blast furnace, which was the first to increase pig iron prices $1 a ton early in November, has announced a further increase of $1.25 for first quarter, coke prices are strengthening, and additional price increases have been announced on some steel products that were not covered by announcements a week ago.

Although important buying came from many sources, railroad orders were conspicuous because of their concentrated volume. Rails and track accessories of more than 800,000 tons were placed on mill books, rails alone accounting for fully 650,000 tons. The Santa Fe ordered 115,000 tons of rails and accessories; New York Central, 82,150 tons of rails; the four Van Sweringen roads, 83,340 tons; Baltimore & Ohio, 52,000 tons; Great Northern about 50,000 tons; Norfolk & Western, 40,000 tons; Missouri Pacific, 33,950 tons; Burlington and Milwaukee roads, each 30,000 tons; Rock Island, 35,000 tons, while a number of other roads ordered smaller amounts.

It was also a gala week in railroad equipment orders and inquiries, with orders for 153 locomotives and about 4100 freight cars, and inquiries pending for 8650 additional freight cars and 16 locomotives, besides extensive repair and new construction to be done in railroads' own shops. Outstanding orders were 100 locomotives for the New York Central, 3025 freight cars and 27 locomotives for the Santa Fe, 600 freight cars for the Western Maryland and 300 for the Gulf, Mobile & Northern. Pacific Fruit Express is inquiring for 2500 cars, Southern Pacific for 2000, Great Northern for 2000, Elgin, Joliet & Eastern for 1050 and Norfolk & Western for 1000.

MOST of the rails and other steel required by the railroads will not be rolled until the first quarter and, with the business normally to be expected from the automobile industry, can companies and miscellaneous sources, steel mills are already assured of well sustained operations during the early months of the year, as present bookings carry well into January in many products. There has unquestionably been considerable anticipatory buying, but it can hardly be called speculative, as most of it is for definite requirements within the next two or three months. The mills have limited orders so that all shipments of low-price tonnage can be made by Jan. 31. Only in the heavy products, shapes and plates in particular, has new buying been in relatively small volume. Sheet makers are out of the market at fourth quarter prices, and hence the new prices are now in actual effect, and the same is true of wire products, on which Dec. 1 was the actual deadline at the old prices.

Additional price announcements have been issued, including $3 on sheet piling, $3 on cut spikes, $4 on screw spikes, $5 on track bolts, $5 on steel car axles, and $4 to $5 on cold-rolled strip. A Middle Western non-integrated roller of cold strip is announcing a $5 increase, although some of the integrated mills have advanced only $4. THE IRON AGE raises its published quotations this week on sheets, wire products and rails, the finished steel composite price advancing to 2.249c., highest since the early part of 1930. Pig iron and scrap composite prices are unchanged.

THE only thing to mar an exceptionally good outlook for the steel industry is the labor threat in the automobile industry, where assembly lines have already been interrupted by lack of ship-

ments by Midland Steel Products Co., whose plant is closed by a strike. The maritime strike has finally caused the cessation of virtually all construction work on the Pacific Coast because materials have run out.

Apart from these difficulties, the steel industry now views 1937 with confidence that all important lines of steel consumption will take more steel next year than in 1936. With indications that 1936 ingot output will approach 47,000,000 tons, some steel interests are confident that next year's total will be fully 50,000,000 tons, barring unforeseen developments.

PRODUCTION of coke pig iron in November totaled 2,993,434 gross tons, compared with 2,991,887 tons in October. Last month's daily rate was 99,781 tons, or 3.3 per cent above the 96,512 tons in October. There were 164 furnaces in blast on Dec. 1, a gain of three since Nov. 1.

Bessemer & Lake Erie is inquiring for 10 Texas-type freight locomotives and two eight-wheel switching locomotives.

Union Railroad Co. is inquiring for four Union-type 10-wheel switching locomotives.

New York Central has ordered 50 Hudson-type passenger locomotives from American Locomotive Co., and 50 eight-wheel switching engines for Pittsburgh & Lake Erie from Lima Locomotive Works.

Wheeling & Lake Erie has placed an order for 10 passenger locomotives with American Locomotive Co.

Rock Island has ordered six diesel locomotives from Electro-Motive Corp. and has purchased six streamlined trains from Edward G. Budd Mfg. Co., and not five, as previously mentioned.

Norfolk & Western is inquiring for 1000 hopper cars and in addition will build in its Roanoke shops eight freight locomotives, 500 gondola cars and 500 hopper cars.

New York, New Haven & Hartford will build 150 50-ton low-side coal cars at its Readville shops, and purchased 75 additional cars.

Southern Pacific, Chicago & North Western and Union Pacific have ordered two streamline trains from Pullman-Standard Car Mfg. Co. Diesel engines are to be built by Electro-Motive Corp.

Norfolk Southern is inquiring for 25 40-ton steel sheathed automobile cars

Elgin, Joliet & Eastern is inquiring for 750 50-ton and 100 70-ton drop-end gondola cars, and 200 50-ton center-dump hopper cars.

Union Pacific has ordered 300 underframes for Mount Vernon Car Mfg. Co.

Lone Star Cement Co. has bought 10 40-ton bucket cars from Pullman Standard Car Mfg. Co.

Gulf, Mobile & Northern has ordered 300 50-ton single-sheathed wood-lined box cars from American Car & Foundry Co.

Western Maryland has purchased 500 box cars and 100 gondola cars from Bethlehem Steel Co.

Pacific Fruit Express will buy 2500 cars.

Southern Pacific is in the market for 2000 freight cars.

Birmingham Southern has been authorized to issue $900,000 in equipment trust certificates to purchase 10 diesel electric locomotives, 100 50-ton all-steel box cars and 25 75-ton all-steel gondola cars. Orders for five each of the locomotives have been placed with the Electro-Motive Corp. and American Locomotive Co. Cars have been awarded to Pullman Standard Car Mfg. Co.

Santa Fe has ordered 1500 box cars from Pullman Standard Car Mfg. Co., 500 box cars from American Car & Foundry Co., 700 refrigerator cars and 325 coal cars from General American Transportation Corp., and 27 locomotives from Baldwin Locomotive Works.

St. Louis-San Francisco has applied for permission to spend $1,301,923 for the following locomotive work: Rebuilding 11 Santa Fe-type freight locomotives, $1,022,-175; rebuilding five engines, $208,440; equipping 12 engines with power reverse gears, 25 engines with Gunderson anti-putty device, $12,242; equipping 25 engines with foamites, $5,698, and 25 engines with syphons, $53,368. Freight car work totaling $1,290,770 includes equipping 600 box cars with sides and doors, $433,200; 100 box cars with AB brakes, $18,387; 500 hopper cars with one-wear rolled steel wheels, $135,500; building 20 new cabooses, $48,064; equipping 100 box cars with Youngstown corrugated steel doors, $16,-320; rebuilding 100 cars and equipping with side doors, $38,824; equipping 4000 freight cars with Creco four-point brake beam support, $81,400; building 400 hopper cars, using some old parts, $519,075. Passenger car work amounting to $260,375 includes building one air conditioned cafe lounge car, $52,692; air-conditioning two business cars, $9,550; air-conditioning 23 passenger cars with Waukesha equipment, $126,040; air-conditioning five combination cars, $17,648; rebuilding snack cars, $27,578. Other expenditures include standard interlocking plant at St. Louis, $16,-700; automatic block signals, $82,700; shop machinery, $13,097.

Great Northern plans to buy $6,500,000 of rolling stock and to spend $12,000,000 on regular maintenance of equipment and $10,-400,000 on maintenance of way. Included will be 500 ore cars, 500 gondola cars, 1000 box cars and 12 passenger coaches. About 11,000 box cars will be equipped with side-frame trucks at a cost of $2,750,000 due to refusal of freight cars for interchange traffic equipped with arch-bar trucks after Jan. 1, 1938. Because of this undertaking, this road will be unable to build any new equipment in its shops next year.

RAILS AND TRACK SUPPLIES

New York Central has purchased 38,500 tons of rails from Carnegie-Illinois Steel Corp., 32,750 tons from Bethlehem Steel Co., 5900 tons from Inland Steel Co., 5000 tons from Algoma Steel Corp. and necessary track accessories.

Rock Island has divided an order for 35,000 tons of 112-lb. rails among Carnegie-Illinois Steel Corp., Inland Steel Co. and Colorado Fuel & Iron Co.

Long Island Railroad has purchased 6000 tons of heavy-section steel rails.

Chesapeake & Ohio has distributed 29,642 tons of 131-lb. rails and 7829 tons of 112-lb. rails as follows: 19,860 tons to Carnegie-Illinois Steel Corp., 13,115 tons to Inland Steel Co., and 4496 tons to Bethlehem Steel Co.

Pere Marquette has awarded 3330 tons of 112-lb. rails to Carnegie-Illinois Steel Corp., 3182 tons to Inland Steel Co., 888 tons to Bethlehem Steel Co., and 1800 tons of 105-lb. rails to Algoma Steel Corp. for its Canadian lines.

New York, Chicago & St. Louis (Nickel Plate line) has placed 13,536 tons of 112-lb. rails as follows: Carnegie-Illinois Steel Corp., 8799 tons; Inland Steel Co., 3113 tons, and Bethlehem Steel Co., 1624 tons.

Santa Fe has divided 155,000 tons of rails and accessories between Carnegie-Illinois Steel Corp., Bethlehem Steel Co., Inland Steel Co., and Colorado Fuel & Iron Corp. Some of the accessories were taken by other companies.

St. Louis Southwestern has awarded 500 tons of rails to Tennessee Coal, Iron & Railroad Co.

Illinois Central has placed 2500 tons of rails with Inland Steel Co., and 2500 tons with Carnegie-Illinois Steel Corp.

Norfolk & Western has ordered 40,000 tons of rails and fastenings, 30,000 tons to be furnished by Carnegie-Illinois Steel Corp. and the remainder by Bethlehem Steel Co.

Erie has placed 16,637 tons of rails with Carnegie-Illinois Steel Corp., 3000 tons with Bethlehem Steel Co., and 17,000 tons with Inland Steel Co.

The Burlington has placed 15,000 tons of rails with Colorado Fuel & Iron Co., 10,000 tons with Carnegie-Illinois Steel Corp., and 5000 tons with Inland Steel Co.

Milwaukee Road has ordered 30,000 tons of rails from Carnegie-Illinois Steel Corp. and Inland Steel Co.

Wabash has been authorized to buy 15,000 tons of 112-lb. rails and necessary fastenings to cost $845,000, to be paid for out of first-quarter earnings.

Baltimore & Ohio has ordered 22,700 tons of 131-lb. rails and 9800 tons of 112-lb. rails from Carnegie-Illinois Steel Corp.; 17,500 tons of 131-lb. rails from Bethlehem Steel Co.; and 2000 tons of 112-lb. rails from Inland Steel Co., for a total of 52,000 tons. The Carnegie-Illinois and Bethlehem orders are subject to a 20 per cent cancellation in tonnage.

Delaware, Lackawanna & Western has purchased 10,000 tons of 131-lb. rails, 1000 tons of joint bars and 1000 tons of tie plates from Bethlehem Steel Co., 1000 tons of 131-lb. rails and 2000 tons of tie plates from United States Steel Corp., and 2000 tons of tie plates and 175 tons of track bolts from Republic Steel Corp. Other accessories for track construction and replacement have been divided among various companies.

Missouri Pacific has divided 22,850 tons of 112-lb. rails and 11,100 tons of 90-lb. rails among Colorado Fuel & Iron Co., Carnegie-Illinois Steel Corp., Inland Steel Co., Bethlehem Steel Co., and Tennessee Coal, Iron & Railroad Co. Of this, 21,400 tons of 112-lb. rails and 6600 tons of 90-lb. rails will go to the Missouri Pacific, the remainder to the Gulf Coast Lines and International-Great Northern.

St. Louis-San Francisco has applied for permission to spend $1,160,297 for track work in 1937, including 75 miles of 112-lb. rails and tie plates, $957,849; and 800,000 tie plates and track fastenings, $200,000.

Great Northern plans to spend $1,750,-000 for rails and fastenings.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous; Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Dec. 1, 1936	Nov. 24, 1936	Nov. 2, 1936	Dec. 3, 1935
Rails, heavy, at mill	**$39.00**	$36.37½	$36.37½	$36.37½
Light rails, Pittsburgh	35.00	35.00	35.00	35.00
Rerolling billets, Pittsburgh	32.00	32.00	32.00	29.00
Sheet bars, Pittsburgh	32.00	32.00	32.00	30.00
Slabs, Pittsburgh	32.00	32.00	32.00	29.00
Forging billets, Pittsburgh	39.00	39.00	39.00	35.00
Wire rods, Nos. 4 and 5, P'gh	**43.00**	40.00	40.00	40.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.80	1.80	1.80	1.80

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	2.05	2.05	2.05	1.85
Bars, Chicago	2.10	2.10	2.10	1.90
Bars, Cleveland	2.10	2.10	2.10	1.90
Bars, New York	2.40	2.40	2.40	2.20
Plates, Pittsburgh	1.90	1.90	1.90	1.80
Plates, Chicago	1.95	1.95	1.95	1.85
Plates, New York	2.19	2.19	2.19	2.09
Structural shapes, Pittsburgh	1.90	1.90	1.90	1.80
Structural shapes, Chicago	1.95	1.95	1.95	1.85
Structural shapes, New York	2.16¼	2.16¼	2.16¼	2.06¼
Cold-finished bars, P'gh	2.35	2.35	2.35	1.95
Hot-rolled strips, P'gh	1.95	1.95	1.95	1.85
Cold-rolled strips, P'gh	2.60	2.60	2.60	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh	**2.80**	2.60	2.60	2.40
Hot-rolled annealed sheets, No. 24, Gary	**2.90**	2.70	2.70	2.50
Sheets, galv., No. 24, P'gh	**3.40**	3.20	3.20	3.10
Sheets, galv., No. 24, Gary	**3.50**	3.30	3.30	3.20
Hot-rolled sheets, No. 10, Pittsburgh	**2.15**	1.95	1.95	1.85
Hot-rolled sheets, No. 10, Gary	**2.25**	2.05	2.05	1.95
Cold-rolled sheets, No. 20, Pittsburgh	**3.25**	3.05	3.05	2.95
Cold-rolled sheets, No. 20, Gary	**3.35**	3.15	3.15	3.05
Wire nails, Pittsburgh	**2.25**	2.05	2.05	2.40
Wire nails, Chicago dist. mill	**2.30**	2.10	2.10	2.45
Plain wire, Pittsburgh	**2.60**	2.50	2.50	2.30
Plain wire, Chicago dist. mill	**2.65**	2.55	2.55	2.35
Barbed wire, galv., P'gh	**2.70**	2.55	2.55	2.80
Barbed wire, galv., Chicago dist. mill	**2.75**	2.60	2.60	2.85
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.25

Pig Iron

Per Gross Ton:	Dec. 1, 1936	Nov. 24, 1936	Nov. 2, 1936	Dec. 3, 1935
No. 2, fdy., Philadelphia	$22.3132	$22.3132	$21.3132	$21.3132
No. 2, Valley furnace	20.50	20.50	19.50	19.50
No. 2, Southern Cin'ti	20.44	20.44	19.44	20.2007
No. 2, Birmingham†	16.88	16.88	15.88	15.50
No. 2, foundry, Chicago*	20.50	20.50	19.50	19.50
Basic, del'd eastern Pa.	21.8132	21.8132	20.8132	20.8132
Basic, Valley furnace	20.00	20.00	19.00	19.00
Malleable, Chicago*	20.50	20.50	19.50	19.50
Malleable, Valley	20.50	20.50	19.50	19.50
L. S. charcoal, Chicago	**26.2528**	25.7528	25.7528	25.2528
Ferromanganese, seab'd, carlots	75.00	75.00	75.00	85.00

†This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent or higher.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	$17.25	$17.25	$17.50	$13.75
Heavy melting steel, Phila.	14.75	14.75	15.75	12.50
Heavy melting steel, Ch'go	16.50	16.50	16.50	13.50
Carwheels, Chicago	**17.00**	16.50	16.50	13.25
Carwheels, Philadelphia	16.75	16.75	16.75	12.75
No. 1 cast, Pittsburgh	16.25	16.25	16.25	14.25
No. 1 cast, Philadelphia	16.75	16.75	16.75	12.75
No. 1 cast, Ch'go (net ton)	**14.50**	14.00	14.00	11.75
No. 1 RR. wrot., Phila.	15.75	15.75	15.75	12.25
No. 1 RR. wrot., Ch'go (net)	14.25	14.25	14.25	11.00

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.75	$3.75	$3.75	$3.60
Foundry coke, prompt	4.25	4.25	4.25	4.25

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn.	10.50	10.50	10.00	9.00
Lake copper, New York	10.62½	10.62½	10.12½	9.37½
Tin (Straits), New York	*51.37½*	52.00	45.87½	52.00
Zinc, East St. Louis	5.05	5.05	4.85	4.85
Zinc, New York	5.42½	5.42½	5.22½	5.22½
Lead, St. Louis	5.05	5.05	4.65	4.35
Lead, New York	5.20	5.20	4.80	4.50
Antimony (Asiatic), N. Y.	12.50	12.50	12.50	14.75

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Dec. 1, 1936	2.249c. a lb.	$19.73 a Gross Ton	$16.17 a Gross Ton
One week ago	2.197c.	19.73	16.17
One month ago	2.197c.	18.73	16.58
One year ago	2.130c.	18.84	13.25

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products represent 85 per cent of the United States output.

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1936	2.249c., Dec. 1	2.084c., Mar 10	$19.73, Nov. 24	$18.73, Aug. 11	$16.75, Sept. 22	$12.67, June 9
1935	2.130c., Oct. 1	2.124c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, April 23
1934	2.199c., April 24	2.008c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	2.015c., Oct. 3	1.867c., April 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

. . . PITTSBURGH . . .

. . . Mills heavily loaded with business for December and January shipment.

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. . . No prices announced as yet on pipe and skelp; cold strip up $4.

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. . . Scrap market shows further signs of strength as ingot output rises.

PITTSBURGH, Dec. 1.—Owing to increased rolling mill schedules, ingot operations in the Pittsburgh district have moved up one point to 72 per cent of capacity. There is little doubt that ingot output will continue around this level or go higher, owing to the certainty of heavy production during December. Wheeling district operations have rebounded to 94 per cent of capacity, a gain of eight points, owing to the resumption of a steel company's Bessemer plant which was shut down last week.

Demand for all steel products has been heavy during the past week and backlogs have been increased considerably. A leading producer of sheets is out of the market at fourth quarter prices, its mills being booked solid for the remainder of this year. New sheet prices on sales for first quarter delivery are effective this week. As backlogs on other finished products were reduced considerably in November, some mills are still able to accept orders at fourth quarter prices for December shipment, although the rolling schedules are filling up so quickly that practically all mills will be out of the market on all steel items before the first of the year.

Wire prices announced last week have become effective Dec. 1 and are subject to change without notice. No producers have given information regarding quotations on sales for first quarter delivery and it is the opinion that a further increase in wire prices might materialize at the beginning of the year or shortly thereafter. Practically all consumers covered their needs several weeks ago in anticipation of wire price advances.

The cold-rolled strip situation is confused inasmuch as only one maker has formally announced a $4 a ton increase. Some non-integrated makers are reported to have been figuring on a price advance higher than $4. In the list of announcements last week, no mention was made as to the first quarter quotations on skelp. As yet the price has not been reaffirmed by any leading producer and there is a possibility that an advance in price may materialize. If such should be the case, pipe prices for first quarter might also be advanced. No large pipe producers have formally announced their attitude on first quarter prices, although it has been a general opinion that present quotations would rule for first quarter business.

Steel producers are expected to be faced with production and delivery problems before the end of the year.

The scrap market has shown further signs of strength following the sale into consumption of approximately 25,000 tons of No. 1 steel at $17.50.

Pig Iron

New orders are extremely light. Some producers in this territory have already realized the higher prices which went into effect at the beginning of last week. The orders have not been large, but in some instances run to 100 tons or more. Production is being maintained at a high rate and consumers are using up a fair portion of their material as fast as it is received.

Semi-Finished Steel

Specifications for semi-finished steel are pouring in following last week's price announcements. Bookings of sheet bars for non-integrated mills are exceptionally heavy. A large dent was made in producers' backlogs during November owing to the absence of large scale buying. For this reason, some mills have room in their schedules for December shipment and will probably be able to accept orders at present quotations for the next few weeks. On the other hand, some steel companies are unable to fulfill the requests of their customers, owing to their own requirements, and are being forced to study their production schedules closely before accepting orders.

Bolts, Nuts and Rivets

Effective Dec. 1 for shipment through December and the first quarter of 1937, track bolts have been advanced 25c. a 100 lb., the new price level being 4c. a lb., f.o.b. usual basing points. As of the same date, screw spikes have been advanced 25c. a 100 lb. to 4.60c. a lb. New business has shown a fair increase within the past week, some of which is attributable to anticipation of higher bolt and nut prices which will be announced in the near future. Producers expect satisfactory production schedules owing to increased demand from automobile makers and railroads. Extensive buying plans on the part of the latter, coupled with substantial repair programs, assure bolt, nut and rivet producers a satisfactory rate of activity during the rest of this year and the early part of 1937.

Bars

Total orders placed in November were at least 15 per cent below those booked in October. Mill backlogs were reduced considerably during the month and many producers still have room in their production schedules for December delivery. Tonnages are being accepted at fourth quarter quotations to the extent that the mill can produce and ship during December. Owing to the step-up in automobile production, substantial releases are being received from car makers. There has been no let-up in the brisk activity of farm implement and tractor manufacturers who are specifying freely. Orders from these sources have been fairly heavy during recent weeks, and it is expected that their production schedules will be at capacity this winter. Bookings of alloy steel bars from both automo-

tive and implement manufacturers have shown a further increase and are at the highest point for several months.

Cold-Finished Bars

Aggregate specifications in November were comparatively light, but since the price announcement last week orders have picked up some. Producers expect a heavy influx during December. Releases from automobile companies are good. Jobbers are specifying more freely. The latter source will undoubtedly place heavy bookings before the end of the year.

Shapes and Plates

Specifications for heavy plates and shapes have shown some improvement. In view of higher prices for first quarter delivery, it is expected that substantial tonnages will be booked in the near future. Mills have had hardly any backlogs on these items and as a result are still in a position to accept orders at fourth quarter prices for December shipment. Spang, Chalfant & Co., Pittsburgh, are inquiring for 575 tons for a building extension at Ambridge, Pa. A large portion of this week's inquiries are composed of privately financed projects. Two of the largest structural awards this week involved projects financed with public funds.

Reinforcing Steel

Announcements of first quarter quotations for reinforcing bars are expected before the end of the month. Meanwhile, new business is seasonally dull. Bids will be taken on Dec. 1 for 325 tons of reinforcing bars for the Panama Canal.

Rails and Track Accessories

The local rail mill will share in many of the recently placed rail orders. Approximatey 17,000 tons of the Erie Railroad's 21,000 ton rail order will be fabricated in this district. Tonnage on the books, approximately 150,000 tons, will assure the rail mill good operations through the first quarter of 1937.

Strip

At the rate new business is being received, some mills will be out of the market soon as far as fourth quarter quotations are concerned. Backlogs are increasing and it is expected that new quotations will be realized as soon as the mills have booked what material they can ship in December. Although one or two companies have announced a $4 a ton advance on cold-rolled strip, some non-integrated makers were considering an advance of $5 or $6. Meanwhile, specifications from automotive interests are heavy and substantial increases have been noted in bookings placed by jobbers, sled manufacturers and electrical appliance makers.

Tin Plate

Tin plate operations continue at 89 per cent. Incoming orders comprise for the most part general line can bookings with a fair portion representing 1937 packers' specifications. Backlogs assure the present rate of operation for at least two or three weeks.

Sheets

Sheet specifications in the past week have been larger than at any time since September. One large producer has notified their district offices not to take any more tonnage at fourth quarter prices before first calling the home office. This company is practically out of the market on all grades of sheets and any future orders taken at the lower quotations will be for those few items on which there is still room in the production schedules for December shipment. It is expected that first quarter prices will be realized within the next week, but in view of the heavy commitments placed within the past several weeks, specifications at the higher quotations will probably be light in volume. Aside from automotive interests, which are releasing heavy shipments, substantial tonnages have been ordered by farm implement and electrical appliance makers. Mills will be confronted with serious production and delivery problems before the end of this year.

Steel Sheet Piling

Inquiries and awards have been light during the past week. The Navy Bureau of Supplies and Accounts will take bids on Dec. 9 for 1500 tons of steel sheet piling for a bulkhead at Sewalls Point, Va. U. S. Engineers Office, St. Paul, will take bids on Dec. 18 for a large tonnage of piling for Mississippi River dam No. 3, at Red Wing, Minn.

Tubular Products

Bookings for locomotive boiler tubes are improving steadily and will receive further impetus as a result of recent railroad buying announcements. Standard pipe specifications are showing slight improvement and it is expected that this item will assume more satisfactory volume as building activity increases. No announcement has been forthcoming on first quarter quotations and the opinion still exists that no advance is in prospect. However, should skelp prices show an increase, there is a good possibility that pipe prices will be advanced also.

Wire Products

The wire prices announced last week are effective Dec. 1, subject to change. As yet, no mention has been made by any company regarding quotations on sales for first quarter delivery. Bookings for manufacturers wire have been increasing and a substantial spurt in this business is expected during the remainder of this week. The same condition exists with relation to merchant wire items. Consumption of the latter has been good, owing to the open weather in the agricultural regions. Producers expect to have all low-priced material cleared from the mills by the second week in January.

Coal and Coke

Coal production has been steadily increasing and is now at a point comparable with 1929. Inquiries for domestic size coke are not as active as a month ago but do show some improvement over the previous week. One steel company, which had been supplying the domestic trade with by-product coke, has withdrawn from this market owing to the resumption of another blast furnace. If pig iron production continues at present levels for any length of time, or increases, some steel companies maintaining by-product coke plants will be forced to purchase beehive furnace coke owing to the inability of their by-product plants to satisfy the needs of the blast furnace department.

Crucible Purchases National Drawn Steel

FOR many years a producer of cold-drawn tool steel and alloy specialties, Crucible Steel Co. of America has indicated its intention of going into the cold-drawn carbon steel market permanently by exercising its option to purchase the former plant of the National Drawn Steel Co., East End district, East Liverpool, Ohio. This plant was originally secured under lease about a year ago by a subsidiary company, the Pittsburgh Crucible Steel Co. The newly acquired property will be developed as a permanent works and will be operated under the name of National Drawn Steel Co., Inc., an Ohio corporation.

. . . . CHICAGO . . . .

. . . Heavy steel buying includes about 225,000 tons of rails.

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. . . Santa Fe's rail and accessory order 155,000 tons; also buys equipment.

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. . . Not much steel can be sold for December at fourth quarter prices.

CHICAGO, Dec. 1.—The price advance for rails sent that market sky high in the closing days of November, when railroads tributary to Chicago mills added 225,000 tons to producers' books. The Santa Fe was the star buyer, with rail and accessory orders totaling 155,000 tons, and also orders for 3025 freight cars and 27 locomotives. Other railroads are also more active in the equipment field, having 30 days' price protection on projects which were under way at the time of the price advances.

With most mills in this district operating at capacity, there is not a great deal of chance for a higher rate until the heavy tonnage products come into greater demand. Structural materials are still lagging, but it now looks as though railroad equipment will fill a large part of the breech which will also be plugged somewhat by expanding rail rolling.

Ingot production is steady at a shade above 77 per cent of capacity.

Price advances are in effect all along the line, and in finished steel, except in the heavy tonnage products, there is not much that can be sold for delivery in the closing month of the old year at fourth quarter prices. Contract business is in such volume that mills will not be able to clear fourth quarter business by the end of the month and shipments will extend through January.

The December prices for wire products, though fully in effect for all new business taken after Dec. 1, are somewhat nullified by heavy contracting in November at the old prices and therefore only spot business will bring in added returns to mills.

Prices for specialty grades of scrap are moving up and the heavy tonnage grades are firmer.

Pig Iron

Books are the heaviest in many years as a result of the scramble to cover prior to the advance in prices. Shipments are moving at a fast clip and there are no indications now of a let-down in demand during December. The movement of coke reflects a melt which is comparable with the November average. Pig iron shipments include actual needs as well as speculative tonnages. Charcoal iron is being marked up 50c. a ton for December deliveries and first quarter prices are expected momentarily.

Rails

The rush to sign orders for rails and accessories has been spectacular during the last three to four days, prior to the advance in price to $39, effective Dec. 1. Chicago mills have benefitted to the extent of not less than 225,000 tons of rails and complementary track supplies totalling about 70,000 tons. All western lines jumped into the market and some releases are already in, so that rail mill operations will at once begin to expand. An interesting development is that these new orders will tax new normalizing departments to the limit; in fact, about double present normalizing facilities could be put to use on the basis of the desire of the railroads to take advantage of this comparatively new development.

Wire Products

New prices go into effect today (Dec. 1). Demand for most wire mill products remains heavy, and output is well established in the range between 70 and 75 per cent of capacity. Deliveries of bright wire to the manufacturing trade are about two weeks. Purchases by public utilities are growing and TVA is making purchases almost daily. Magnet wire is in good demand, which promises to hold up for some weeks to come. Farm equipment manufacturers are sending in heavier specifications and they will need more wire as winter production schedules grow. The automobile group gives indication that it has reached its fall peak. Wire mills count on better railroad orders for fencing on the score that high-speed trains will call for better protection of rights of way.

Sheets

Most mills are scheduled full to the end of the year and very little tonnage can be taken for delivery this month at the old prices. In fact, most deliveries extend to the end of January so that much new business taken at the higher prices will not reach consumers until February. It is already apparent that mills will ship tonnage taken at fourth quarter prices until the end of January at least.

Bars

The price situation, together with deliveries that extend for three to four weeks, has brought much new business to producers, with the result that books are all but filled for the remainder of the year. Buyers are freely entering specifications. The Bendix plant at South Bend, Ind., is again in operation. J. I. Case Co., Racine, Wis., has purchased a factory at Moline, Ill., as a possible way out of its labor difficulties. Several agricultural implement manufacturers have been forced to revise upward production schedules which only a week or two ago had been raised and had been considered ample for mid-winter requirements.

Structural Material

First quarter prices went into effect today (Dec. 1), but because

of the slowness of the market, no flurry was felt. There is little concern even as to the 30-day protection privilege for the reason that only a moderate number of projects of size are now being planned. A Wisconsin fabricator has taken 3500 tons for a bridge in Florida. Noteworthy among fresh inquiries is 1000 tons for a brewery addition in Milwaukee.

Warehouse Business

November business closed below the October volume. City demand held up better than orders from the country. Consumers' tendency to hold down inventories near the year end is in strong evidence notwithstanding that they are in a rising price market. Warehousemen have made no move so far to match their price lists with the higher quotations recently announced by mills.

Plates

The prices advance, effective for first quarter, is putting new life into the plate market. About 7000 tons of line pipe is out for figures, and railroad equipment business is snapping forward as in pre-depression days. Over 7500 freight cars for early purchase have been added to pending lists. These will be bought by the Santa Fe, Southern Pacific and the Pacific Fruit Express. More business of this kind is to come during the 30 days allowed for price protection on specified projects. There is also a noticeable speeding up of heavy railroad equipment repairs. For example, the Northern Pacific will do extensive work on 11,000 old cars.

Reinforcing Bars

Orders which seemed to be at the point of release early in the week have not come through and the trade cannot account for the delay. The outstanding prospect for new tonnages is a $2,000,000 WPA fund for new public school buildings in Chicago. Most shop schedules are slowly being lowered, which is a change strictly in accordance with usual seasonal influences. The State of Illinois will continue its bridge program through the winter, the newest request for prices being on 600 tons of bars. Prices are still highly variable on most business except where less than 100 tons is involved.

. . PHILADELPHIA . .

. . . Price announcements bring large volume of buying.

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. . . Close watch being kept on speculative purchases.

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. . . Operations remain at 54½ per cent of capacity.

PHILADELPHIA, Dec. 1. — A steady stream of orders has been flowing into steel companies' sales offices here following last week's price announcements. Seller's are following a variety of procedures in regard to the application of the price increases to their customers. Some are quoting the higher prices after today regardless of when the material can be shipped, while others are confining the increase to business which will be delivered after the first of the year, shipments made before Jan. 1 going at third quarter prices.

The scarcity of coke is becoming rather serious, and the wholesale price of industrial coke in Philadelphia was raised 10c. a ton today, which boosts the retail price 30c., from $9.95 to $10.25 a ton.

It also was announced here late Monday that the Mystic furnace, Everett, Mass., had increased the price of pig iron $1.25 effective today. Steel operations in this district are unchanged at 54½ per cent of capacity.

The Baltimore & Ohio Railroad ordered 52,000 tons of 131-lb. and 112-lb. rail.

Pig Iron

The Everett furnace, which increased prices $1.25 per ton today, is due to blow out today also, while the Troy unit went out of blast Wednesday afternoon, Nov. 25. The output of both these furnaces is said to be almost completely sold out to consumers who have been covered against price advances for several weeks. Troy is scheduled to return to blast some time in March or early April. Sales are quiet, but shipments are heavy. Little buying, except in small quantities, is reported, and although iron is not plentiful, most of the buyers seem to have anticipated their requirements for the remainder of the year, and are not in want. Algerian low phosphorus iron ore is hard to obtain for less than 13.50c. per unit, while manganiferous ores cannot be secured for under 30c. per unit. Some here expect the price of ferromanganese to rise $5 to $10 per ton owing to increased costs of manufacture.

Plates and Sheets

Due mainly to pre-price increase stimulation, plate business this week is the best for some time. Large tonnages are not prevalent, however. Tonnage may flow into this district as a result of the locomotive orders received recently by Baldwin Locomotive Works and American Locomotive Co. It is regarded as fairly certain here that 1937 will see a greatly increased amount of railroad purchasing of one kind or another. Last week's buying spurt was not so noticeable in sheets, since more anticipatory buying was reported in that product than in most others. Demand was good, however, and shows no signs of abating. One sheet seller's books have not been open for additional business at third quarter prices since Nov. 25, while in two instances no further business in strip has been taken for several days at old prices. It has been reported, but not confirmed, that one of the largest producers is making the new price on sheets effective today, but is extending the limit on plates, shapes and bars until the first of the year. There is considerable uncertainty in respect to the first quarter skelp price, no announcement having been made at this time.

Wire and Wire Products

The same wave of buying which has affected other steel products in the past week has spread to

the wire companies' offices. One seller is quoting the higher prices on all business taken after today, but will protect customers on contract until the end of the year. Inquiries are numerous at present, but a sharp decrease is seen later in December. An effort is being made not to accept business which cannot be delivered by Jan. 1, but it is expected that deliveries will lap over a few days nevertheless. Demand for manufacturing wire is good, while nails are still not being sought actively. It is believed that the higher prices will be accepted by the trade without question. A close watch is being kept on orders so as to prevent speculative purchasing.

Shapes and Bars

Structural awards continued this week at about the pace that has been followed for the past month. American Bridge Co. was awarded 200 tons of shapes for a bridge in Tioga County, and Bethlehem Fabricators received 125 tons for a Princeton theater. Bids will be taken at Trenton, Wednesday, for a L. A. Young Spring & Wire Corp. building requiring about 500 tons of shapes. Plans are being worked on now for three elementary schools in Philadelphia to be started in the spring, each to require about 300 tons of shapes. Also under way are plans for a high school at 74th and Dicks Avenue, which may need as much as 2000 tons of shapes. Bethlehem Steel Co. was awarded about 225 tons of sheet piling for projects in Chester and Ronk, Pa. A high school in Lebanon, Pa., requiring 460 tons of reinforcing bars and 275 tons of shapes was opened for bids last Friday. Consolidated Engineering Co., Baltimore, was low bidder.

Imports

The following iron and steel imports were received here during the past week: 2007 tons of chrome ore from British South Africa; 1500 tons of chrome ore from the Philippine Islands; 57 tons of steel tubes, 31 tons of steel billets, 204 tons of sponge iron, 32 tons of cold drawn steel wire, 43 tons of steel bars and 4 tons of steel forgings from Sweden.

. . .BOSTON. . .

. . . Mystic advances pig iron price $1.25 a ton.

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. . . Makes total rise of $2.25 by this maker.

BOSTON, Dec. 1.—The Mystic Iron Works today blew out its furnace and advanced the price of pig iron $1.25 a ton, effective at once. This is the second advance Mystic has made within a few weeks, the first of $1 having been announced early in November. Although the furnace probably will not be blown in again until spring, ample stocks have been piled to supply the trade during the next few months. Indian iron has been increased $1 a ton. Current buying of pig iron is very light, but furnaces are making heavy shipments against the contracts that were taken prior to price advances.

By-product foundry coke has been advanced 50c. a ton to $12 a ton, delivered.

Cast iron pipe has been advanced $2 a ton to $45 a ton, f.o.b. cars Everett, Mass.

New York, New Haven & Hartford Railroad will build 150 50-ton low-side coal cars at its Readville shops and will purchase 75 additional cars.

. . BIRMINGHAM . .

. . . Southern mills have heavy backlogs.

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. . . Two blast furnaces are blown in.

BIRMINGHAM, Dec. 1.—Steel mills and blast furnaces now have heavy backlogs and face a long period of steady and substantial operations. Most of the steel departments are being pushed to capacity. In recent weeks there has been a heavy inflow of new orders, rushed in ahead of the price advance.

Last week there were increases in pig iron production. Two furnaces were blown in. On Nov. 25 the Tennessee Coal, Iron & Railroad Co. blew in Ensley No. 6 on recarburizing iron; on Nov. 27, Sloss-Sheffield blew in No. 3 at North Birmingham on foundry iron. Fifteen blast furnaces are now in operation, six on basic iron, eight on foundry and one on recarburizing. Tennessee Coal, Iron & Railroad is operating seven out of eight; Sloss-Sheffield, three out of four; Woodward Iron Co. all three of its Woodward stacks and Republic Steel both of its furnaces. Only three furnaces that may be considered as serviceable are now idle in the district.

Open-hearth operations continue at 16 units. The Tennessee company is operating seven at Fairfield and four at Ensley; Gulf States Steel, five at Gadsden.

On Saturday the Tennessee company announced that it had awarded contract for grading and excavation for its new Fairfield strip and tin plate mill to the Hooper Construction Co., Bunnell, Fla., and the Lacey Construction Co., Selma, Ala., jointly. The contract was awarded on a competitive basis and there were 14 bidders. Work is to start immediately and is to be completed on or about April 15, 1937.

. . . .BUFFALO. . . .

. . . Steel plant operations hold at peak rate.

BUFFALO, Dec. 1.—Producers report scattered buying of pig iron, with specifications still steady against old orders. Little is expected in volume buying now before February, and makers are concentrating on getting shipments out. Operations remain the same, with 12 furnaces in blast.

Steel mill operations are still at a high clip with Bethlehem's Lackawanna plant's running 22 open-hearth furnaces; Republic Steel Corp., 7, and Wickwire Spencer Steel Co., 2.

Fabricators of structural steel and reinforcing bars report a steady and large business in small lots, with few sizable jobs being figured. There is considerable interest in bids which close Dec. 4 on 400 tons of structural for a grade crossing job across the Delaware, Lackawanna & Western tracks at Transit Road near Buffalo. Bids close Dec. 8 on the 300 tons in the Buffalo sewage disposal plant main building.

. . . CLEVELAND . . .

. . . Flood of steel orders precedes effective date of advances.

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. . . Additional price increases cover sheet piling, spikes, track bolts, cold-rolled strip.

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. . . Mills will be crowded through January; sheets sold at new prices.

CLEVELAND, Dec. 1. — A flood of orders for finished steel has followed the announcement of price advances. Consumers are covering for future requirements and most buyers evidently will put in enough stock at the old prices to carry them through January or longer. Sheet and cold strip mills that previously had about all the tonnage they could get out in December quickly became filled up and several have withdrawn entirely from the market.

With the rail price advance announced, the four railroads here quickly jumped into the market and purchased 83,340 tons of rails for first quarter delivery. The purchases were made by the Chesapeake & Ohio, Erie, Nickel Plate and Pere Marquette. To lay these rails 20,000 tons of accessories will be required and these are now being bought. The Chesapeake & Ohio took bids Saturday against its recent inquiry for 2000 freight cars.

Ingot output in the Cleveland-Lorain district declined two points to 76 per cent of capacity this week, one open hearth being forced down for relining. In the Valley district it advanced four points to 78 per cent of capacity.

Finishing mills will be crowded through December to get out the steel now on their books and some tonnage will be carried over into January. Some mills, however, are trying to restrict their bookings to what they can roll this year. Sheet sales in sizable lots at the advanced prices have been made to consumers who want to be sure of deliveries when wanted next month. Mills are not yet filled up with bar or hot strip orders for December rolling. However, some are endeavoring to restrict orders to customers' normal requirements.

Additional price advances for the first quarter include $3 a ton on steel piling, $3 on spikes, $4 on screw spikes, $5 on track bolts and $5 on steel car axles. Bolts and nuts are also being advanced.

Pig Iron

Sales stopped with the $1 a ton price advance, as was expected, and, with consumers covered with enough iron to last them several weeks, little new business is expected during December. Consumers are issuing releases for this month, during which shipments are expected to considerably exceed those of November, when there was a gain of about 15 per cent over October. In addition to more iron required by the motor car foundries, there is increase in the demand from railroads and makers of railroad equipment and from jobbing foundries. A price advance on Ohio silvery iron is looked for this week. The Interlake Iron Corp. today blew in its Perry furnace at Erie and is now operating five out of six stacks.

Sheets

The announcement of the price advance was followed by a rush by consumers to place orders at the old prices. Considerable new tonnage was entered during the week and the amount would have been larger had the mills been able to book more business for December. Several have withdrawn from the market on all grades, having orders for all the sheets they can get out this month and some expect to have quite a carryover for January. Sales of several sizable lots have been made at the new prices for specified January shipments to consumers who wish to protect themselves against possible delays in getting steel as needed.

Strip Steel

The $4 a ton advance on cold-rolled strip to 2.80c., Pittsburgh, announced by one or two manufacturers, has been adopted by other makers, some of whom hesitated about limiting the advance to $4. Commodity grades and fender stock have also been advanced $4 a ton. There had been talk of an advance of as much as $5 to $6 a ton on cold strip. When hot strip was advanced $2 for the third quarter, cold strip was left unchanged, much to the disadvantage of non-integrated cold strip mills that had to pay more for their raw material. With no greater advance on cold strip than on hot, the non-integrated mills are put in a somewhat more unfavorable position. Mills have heavy backlogs of cold strip and several are accepting no more fourth quarter orders. Others are taking no more hot strip tonnage and some only wide hot material. A heavy volume of orders was placed during the week, mostly from the motor car industry which has taken up the tonnage available for December.

Bars, Plates and Shapes

An increase in the volume of bar orders followed the first quarter price advance. Mills, however, can still make fair deliveries. While the price advance has not stimulated the demand for structural shapes, it has resulted in taking protection for large tonnages of steel for identified projects. Fabricators are being given until Jan. 1 to close contracts against these projects. Structural awards and inquiries are light. Plans are expected out in two weeks for the Republic Steel Corp.'s continuous strip mill in Cleveland, requiring an estimated 14,000 tons. Some railroad tonnage in bars, plates and shapes is being placed for first quarter requirements for repair work. No price announcement has been made on reinforcing bars.

Rail and Track Supplies

The four Van Sweringen railroads late last week purchased 83,-

340 tons of rails for delivery before March 31. For laying these rails over 20,000 tons of tie plates, spikes and track bolts will be required. A portion of these accessories have already been placed and the remainder will probably be purchased during the week. The rail purchases were: Chesapeake and Ohio, 37,471 tons; Erie, 21,333 tons; Nickel Plate, 15,336 tons and Pere Marquette, 9200 tons.

In adition to the $2 a ton advance on tie plates and $3 on angle bars, spikes have been marked up $3 a ton to 2.90c. a lb., screw spikes $4 to 4.60c. and track bolts $5 a ton to 4.00c. Steel car axles have been advanced $5 a ton to 3.15c. These advances became effective Dec. 1 for the first quarter.

...Frisco lines to spend $5,331,035 in 1937.

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...Missouri Pacific orders 33,950 tons of rails.

ST. LOUIS, Dec. 1.—The St. Louis-San Francisco Railway has asked the Federal Court here for authority to expend for improvements in 1937 a total of $5,331,035, of which $2,184,871 is net. The items include track work totaling $1,160,297, including 75 miles of 112-lb. rails, $822,321; tie plates for new rail, $135,528, and 800,000 tie plates, including rail anchors, gage rods and other track fasteners, $200,000; locomotive work totaling $1,305,630, freight car work totaling $1,290,770. (For further details see railroad equipment items.)

The Missouri Pacific Railway has placed orders for 22,850 tons of 112-lb. rails and 11,100 tons of 90-lb. rails, a total of 33,950 tons, with the Colorado Fuel & Iron Co., Carnegie-Illinois Steel Corp., Tennessee Coal, Iron & Railroad Co., Inland Steel Co. and Bethlehem Steel Co. The Missouri Pacific will get 21,400 tons of the 112-lb. rails and 6600 tons of the 90-lb. rails, the remainder to go to the Gulf Coast Lines and the International-Great Northern.

Federal Judge Davis authorized the Wabash Railway to buy 15,000 tons of 112-lb. rails and necessary fastenings to cost $845,000, to be paid for out of first quarter earnings.

Notice of an advance of from $3 to $4 a ton in the prices of finished iron and steel from the mills as of Dec. 1 stimulated considerable buying in the lines affected. The advances were of sufficient size to warrant consumers to increase their inventories, whereas the previous $2 advance was not so regarded. Heavy advance buying was especially true of factors making standardized products, such as stove manufacturers, bed springs makers, etc. Buying of nails, fencing and roofing also has been stimulated. Commitments for structural shapes have not been so heavy as those in other lines.

A few orders were received for pig iron after the advance of $1 a ton had been put into effect on Nov. 23. However, most melters had anticipated the advance with heavy purchases, and are for the most part covered on their requirements well into the first quarter. Shipments correspond to a heavy melt, as very little pig iron is being put into stock. It is expected that November shipments will be the heaviest for the year. The agricultural implement activity is gradually approaching the peak, which it is expected to reach about Dec. 15. Operations of stove manufacturers in the district are slowing up some.

...Heavy sheet buying caused by price rise.

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...Ingot production is steady at 94 per cent.

CINCINNATI, Dec. 1.—The leading sheet interest in the district has advanced prices $4 a ton on all sheet products except ingot iron, long ternes and enameling sheets, which were increased $3. Bookings just prior to the announcement were heavy, and it appears that most users have bought two or three months' requirements. New prices have been accepted without complaint, consumers generally having been well prepared. Mill operations are unchanged at full capacity, with forward schedules set at the same rate. Quotations on secondary sheet products, rejects and wasters have been advanced $2 a ton.

Ingot production is steady at about 94 per cent with all open hearths except two in operation.

Pig iron ordering dropped abruptly the past week, following price advance in the mid-week. Up to that time, ordering was at the high average of the preceding weeks. Prices on both Northern and Southern iron are up $1. The new quotation on Northern is $20.82, delivered Cincinnati, while Southern of 0.70 or more phosphorus is 38c. less. Shipments of pig iron have spurted as melters seek to get all material on order into their yards. Foundry operations are steady at about 70 per cent.

...Business is holding at a high level.

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...Pig iron output in October up 35 per cent.

TORONTO, Ont., Dec. 1.—New business continues at a good level. Munitions contracts from Great Britain are in prospect, and some business on this account already has been awarded. Several Canadian plants are installing tools and equipment and improving plants generally to take care of the looked-for large contracts. Steel companies are spending several millions of dollars for replacements. Mining companies are placing substantial orders for equipment, and there is good call for steel from the automotive industry.

Pig iron and steel production is running at the peak level for the year. Canadian output of pig iron in October totaled 70,051 gross tons, a gain of 35 per cent over the preceding month. Algoma Steel Corp., Sault Ste Marie, Ont., blew in a 450-ton furnace that had been banked, bringing active stacks to six at the end of the month. Output of steel ingots and castings totalled 98,330 tons in October against 86,077 tons in September.

. . . . NEW YORK. . . .

. . . Sellers limit orders to insure January delivery.

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. . . Cold-rolled strip up $4; Jan. 15 delivery deadline on wire products.

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. . . Railroad purchases mount as protective period closes.

NEW YORK, Dec. 1.—A rush of buying prior to today, when price advances for first quarter take effect, has loaded the mills with considerable tonnage, especially in sheets, in which some mills are now out of the market for deliveries this year.

In carbon bars, plates and shapes, mills are still able to promise December shipment at the fourth quarter prices. The general policy has been and still is that of scaling consumer requests for protection in an attempt to insure complete delivery of all low-price tonnage by the end of January. Even earlier deadlines are planned for certain products. For instance, all deliveries of coated stock, such as manufacturing ternes and tin mill black plate, will probably clear the mills by Dec. 31, and mills have been instructed to liquidate all low-price orders on wire products by Jan. 15.

Practically all consumers are very well covered, not only against early first quarter requirements, but also, in some cases, for almost the entire quarter. Warehouses and jobbers particularly have laid in stocks in anticipation of sustained demands from smaller consumers who may run short of material because of the congested condition at mills. Interest in commitments at the higher price levels has been almost nil, but this is a characteristic condition at the end of any protective period and will probably show little change throughout the month. Tin plate mills are busy filling canners' orders for the Southern pack in January, and, in many instances, releases are being received against material which will not be used until next June and July. Thus, those can makers who were embarrassed by delayed deliveries during peak demand this year are taking precautions against a similar situation in 1937.

Cold-rolled strip has been advanced $4 a ton for first quarter, from 2.60c. to 2.80c., Pittsburgh. No formal announcement on skelp has been made, but a $2 advance is likely. However, pipe prices will probably remain unchanged, even though the disorganized resale situation has latterly shown distinct improvement in all those areas outside of the New York district. Alloy bars are up $4 for first quarter, but the status of reinforcing bars is uncertain as sellers have recalled present price lists but are still delaying formal announcements for first quarter. Cut spikes are up $3 a ton to 2.90c., f.o.b. Pittsburgh mill, screw spikes are up $4 a ton to 4.60c. and track bolts are $5 higher at 4c. a lb.

Mills all over the country experienced an inrush of railroad orders during the past seven-day period as the protective period drew to a close. In this district, the New York Central allocated 82,150 tons of rails among four producers, awarded 50 locomotives to American Locomotive Co. and 50 switching engines to Lima Locomotive Works. The Lackawanna bought 10,000 tons of rails and 2000 tons of track accessories from Bethlehem, 1000 tons of rails and 2000 tons of tieplates from U. S. Steel and 2000 tons of tieplates and 175 tons of track bolts from Republic.

Pig Iron

Mystic furnace at Everett, Mass., has raised the price of iron $1.25 a ton for first quarter shipment, the increase taking effect today with the opening of producers' books for the first quarter. This marks the second advance this year in the Everett base price, the first of $1 a ton having taken effect on Nov. 4. The announcement of a new price today was made as the furnace was preparing to go out of blast, officials having earlier decided to close operations by Dec. 1. The Troy, N. Y., stack closed down on Nov. 25. While it is too early to observe effects of Mystic's action on prices generally, other furnaces are now weighing possibilities. Some additional buying was stimulated by a fear of a second general increase for the first quarter, but sellers expect little new business to develop over the next few weeks. With cold weather prevailing, the Erie barge canal is due to suspend traffic. Sinking of a barge and tug over the week-end in Lock 18 of the Buffalo route has held back several bottoms, and ice may form before the way is again clear. Considerable iron in the form of cast segments will be required for lining the second Midtown Hudson Tunnel between Weehawken, N. J., and Manhattan, on which business bids close Dec. 8. Approximately 52,700 tons of cast iron tunnel lining will be needed.

Cast Iron Pipe

Higher raw material and labor costs have been responsible for a $2 increase in cast pipe prices, making the delivered New York quotation on 6 in. and larger pipe about $48 a ton. A few Federal projects are pending at near-by New York and New Jersey points, and will take a moderate tonnage.

Reinforcing Bars

The only award of consequence to be reported this week was 100 tons for a laundry in Jersey City which went to Joseph T. Ryerson & Son, Inc. The small tonnage coming in is apparently sufficient in the aggregate to keep sellers of bars occupied, although a great deal more business could be accommodated. Prices generally appear to have firmed, but bids on public lettings are still occasionally well under base prices.

..SAN FRANCISCO..

. . . Strike halts work on building projects.

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. . . Only two new jobs of size reported.

SAN FRANCISCO, Nov. 30.—Only two definite new projects of any size were announced last week, on both of which bids will be opened Dec. 9. Bids on the construction of a pipe line between Lake Chaplain and Everett, Wash., involving approximately 6200 tons of plates, and announced several months ago, will be opened on that date. The other project involves further construction work on the Hetch Hetchy water supply project for San Francisco and includes 3000 tons of structural steel.

Building construction came to an almost complete standstill as shipments of steel and other construction materials were held up by prevailing strike conditions. Many projects, already started, were forced to discontinue operations because of lack of materials and others have been postponed until strike settlement.

All awards during the week were small. Structural lettings totaled only 1567 tons, while reinforcing bar awards were 2840 tons. Largest single award was 635 tons of bars required in the construction of a post office at San Diego, Cal.

Contemplated projects, on which bids will probably be opened in the first quarter of next year, include dam construction at Sacramento, Cal., irrigation and power development at Imperial, Cal., and a water supply system for Tacoma, Wash. The Sacramento project involves construction of dams on the Yuba, Bear and American rivers, expected to reach a total cost of $6,000,000. Bids will probably be called for in January by the Imperial Irrigation District on its $2,700,000 power project. Tacoma has just applied to the PWA for aid in financing a $1,566,000 water supply line.

REINFORCING STEEL

. . . Awards of 4200 tons —2370 tons in new projects.

AWARDS

Somerville, Mass., 282 tons, Ford Motor Co. unit, to Truscon Steel Co.

Boston, 235 tons, Dartmouth Corp. office building, to Concrete Steel Co.

Lawrence, Mass., 225 tons, American Woolen Co. filtration plant, to Concrete Steel Co.

Lynn-Saugus, Mass., 180 tons, State road, to Bethlehem Steel Co.

Wallingford, Vt., 240 tons, overpass, to Bancroft & Martin Rolling Mill Co.

Cleveland, 800 tons, sewage disposal plant, to Concrete Steel Co.

San Diego, Cal., 635 tons, post office, to Soule Steel Co.

Ukiah, Cal., 222 tons, Mendocino State hospital, to Kyle & Co.

Los Angeles, 156 tons, bridge, to Soule Steel Co.

Los Angeles, 145 tons, Vermont Avenue school, to Blue Diamond Steel Corp.

Donner Summit, Cal., 114 tons, State highway construction, to Truscon Steel Co.

Albuquerque, N. M., 105 tons, library for University of Mexico, to Colorado Builders Supply Co.

Boise, Idaho, 102 tons, State underpass, to Bethlehem Steel Co.

Bonner County, Idaho, 100 tons, road improvement in Kanikau National Forest, to an unnamed bidder.

Portland, Ore., 124 tons, three bridges, to an unnamed bidder.

Denver, 525 tons, All-American Canal project, to Bethlehem Steel Co.

NEW REINFORCING BAR PROJECTS

Boston, 350 tons, Liberty Mutual Insurance Co. building.

Springfield, Mass., 250 tons, city requirements.

Indianapolis, 180 tons, suburban railway car barns and office building.

Evanston, Ill., 190 tons, post office.

Chicago, 800 tons, Jane Addams housing project; Milton Bein, general contractor.

State of Illinois, 600 tons, five highway bridges.

..CAST IRON PIPE..

Southbridge, Mass., has closed bids on 520 tons of 16 and 20-in. pipe. United States Pipe & Foundry Co. is low bidder.

Swanton, Vt., will close bids Dec. 11 for 14,000 ft. of 10-in. class 150. PWA has approved project.

United States Pipe & Foundry Co. is low bidder on 337 tons of 4, 8, 10 and 12-in. and 158 tons of 24-in. required by Connecticut Metropolitan District for stock.

Tyler, Tex., closes bids Dec. 11 for pipe and fittings for water system. Hawley, Freese & Nichols, 206 Ford Street, Tyler, are consulting engineers.

Mount Hope, Kan., asks bids until Dec. 11 for 16,800 ft. of 2, 4 and 6-in. for water system; also for 50,000-gal. elevated steel tank and tower and other waterworks intallation. Cost about $46,000. Paulette & Wilson, National Reserve Building, Topeka, Kan., and Farmers' Union Building, Salina, Kan., are consulting engineers.

Battle Creek, Mich., plans pipe lines for extensions and replacements in water system; also other waterworks improvements. Cost close to $50,000. Shoecraft, Drury & McNamee, Ann Arbor, Mich., are consulting engineers.

Board of Boone County Supervisors, Boone, Iowa, plans about six miles of 4-in., for water supply to County home, including 10,000-gal. elevated steel tank at latter point. Fund of $62,000 has been arranged through Federal aid.

Lenexa, Kan., closes bids Dec. 18 for pipe for water system; also for two elevated steel tanks and towers and other waterworks installation. Cost about $68,000. Shockley Engineering Co., Graphic Arts Building, Kansas City, Mo., is consulting engineer.

General Purchasing Officer, Panama Canal, Washington, asks bids until Dec. 14 for 10,800 ft. of 2 and 4-in. cast iron soil pipe; also for soil pipe fittings (Schedule 3200).

South Gate, Cal., plans pipe lines for water system and other waterworks installation. Fund of $45,300 is being arranged through Federal aid. Guy Nevill is city engineer.

Liberty Center, Ohio, has secured fund of $60,300 through Federal aid for pipe lines for water system and other waterworks installation.

Circle, Mont., plans pipe lines for water system and other waterworks installation. Fund of $36,360 has been secured through Federal aid. E. R. Becroft, Glasgow, Mont., is consulting engineer.

Olathe, Kan., closes bids Dec. 18 for 15,840 ft. of 6-in. for extensions in water system. E. T. Archer & Co., New England Building, Kansas City, Mo., are consulting engineers.

Hartford, Ky., will ask bids soon for pipe for water system; also for 75,000-gal. elevated steel tank and tower, pumping machinery and accessories, filtration machinery and other waterworks equipment. Cost about $380,000. Thornton & Westcott, Carry Building, Owensboro, Ky., are consulting engineers.

Glendale, Cal., has awarded 365 tons of 6, 8, and 12-in. to United States Pipe & Foundry Co.

Bountiful, Utah, will open bids Dec. 17 on 212 tons for a water line.

Newport Beach, Cal., will open bids Dec. 14 on 190 tons of 10 and 14-in. pipe for a sewage disposal project.

. . .NON-FERROUS. . .

. . . *World visible supplies of tin increase 4106 tons in November.*

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. . . *Over 88,000 tons of domestic copper booked.*

NEW YORK, Dec. 1.—Copper markets were inactive last week, the domestic situation being largely unchanged and export business tapering as a result of reduced speculative enthusiasm on the part of foreign buyers. The domestic price for electrolytic copper continues firm, however, at 10.50c. a lb., Valley, while export transactions are now being based on approximately 10.70c., c.i.f., European ports. Domestic bookings of new orders amounted to 771 tons yesterday, which accordingly placed total sales for the month at 88,177 tons. Forward tendency is for the market to proceed quietly in view of earlier heavy buying.

The Week's Prices. Cents Per Pound for Early Delivery

	Nov. 25	Nov. 26	Nov. 27	Nov. 28	Nov. 30	Dec. 1
Electrolytic copper, Conn.*	10.00	....	10.50	10.50	10.50	10.50
Lake copper, N. Y.	10.12½	....	10.62½	10.62½	10.62½	10.62½
Straits tin, Spot, New York	52.50	....	52.60	....	52.00	51.37½
Zinc, East St. Louis	5.05	....	5.05	5.05	5.05	5.05
Zinc, New York†	5.42½	....	5.42½	5.42½	5.42½	5.42½
Lead, St. Louis	5.05	....	5.05	5.05	5.05	5.05
Lead, New York	5.20	....	5.20	5.20	5.20	5.20

* Delivered Connecticut Valley; price ¼c. lower delivered in New York.
† Includes emergency freight charge.
Aluminum, virgin 99 per cent plus 19.00c.-21.00c. a lb. delivered.
Aluminum, No. 12 remelt No. 2 standard, in carloads, 16.75c a lb. delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 12.50c. a lb., New York.
Quicksilver, $88.50 to $92.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 10.75c. a lb., delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	52.50c. to 53.50c.
Tin, bar	54.50c. to 55.50c.
Copper, Lake	11.50c. to 12.50c.
Copper, electrolytic	11.50c. to 12.50c.
Copper, castings	10.75c. to 11.75c.
*Copper sheets, hot-rolled	17.75c.
*High brass sheets.	15.87½c.
*Seamless brass tubes	18.12½c.
*Seamless copper tubes	18.25c.
*Brass rods	13.87½c.
Zinc, slabs	5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig.	5.75c. to 6.75c.
Lead, bar	6.75c. to 7.75c.
Lead, Sheets, cut	8.75c.
Antimony, Asiatic	13.00c. to 14.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.50c. to 20.00c.
Solder, ½ and ½	31.00c. to 32.00c.
Babbitt metal, commercial grades	25.00c. to 65.00c.

* These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 33⅓ per cent allowed off for extras, except copper tubes and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	56.50c.
Tin, Bar	58.50c.
Copper, Lake	11.50c. to 11.75c.
Copper, electrolytic	11.50c. to 11.75c.
Copper, castings	11.25c. to 11.50c.
Zinc, slabs	6.50c. to 6.75c.
Lead, American pig.	5.90c. to 6.10c.
Lead, bar	8.50c.
Antimony, Asiatic	15.25c.
Babbitt metal, medium grade	20.25c.
Babbitt metal, high grade	61.50c.
Solder, ½ and ½	32.25c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal).

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.12½c.	8.87½c.
Copper, hvy. and wire	8.00c.	8.50c.
Copper, light and bottoms	7.25c.	7.75c.
Brass, heavy	4.87½c.	5.50c.
Brass, light	4.00c.	4.75c.
Hvy. machine composition	7.00c.	7.50c.
No. 1 yel. brass turnings	6.00c.	6.50c.
No. 1 red brass or compos. turnings	6.75c.	7.25c.
Lead, heavy	4.25c.	4.62½c.
Sheet aluminum	13.25c.	14.75c.
Zinc	2.50c.	2.87½c.
Cast aluminum	12.12½c.	13.25c.

Lead

While buying of pig lead is less active than a fortnight ago, opening of January books today brought in appreciable inquiry and for the most part sellers disposed of their allotted tonnages without trouble. The day's business was divided about equally between December and January positions. With buyers still uncovered on 20 per cent of their December requirements and a new month opening ahead, demand should show no appreciable shrinkage over the remainder of the year. The price for the metal continues firm and unchanged at 5.05c. a lb., St. Louis and 5.20c., New York.

Zinc

Volume of sales contracted last week owing to uniformly higher prices based on 5.05c. a lb., East St. Louis. The undertone continued strong, however, and shrinkage in demand occurred only with respect to outset of the preceding period when some low-priced metal was still being offered. Prime Western bookings for the week just ended amounted to about 2500 tons, and shipments came to 5700 tons. Immediate outlook is for continued quiet trading, as consumers, particularly those in the galvanizing industry, are well covered ahead. Sellers, faced with heavy order backlogs, are not disposed to press for additional business. The Joplin ore market continues unchanged at $31.50 and $32.50 a ton.

Tin

World visible supplies of tin, including the Eastern and Arnhem carryover, increased 4106 tons during November to a total of about 21,000 tons as the month ended. Largely as a reflection of this appreciable increase, consumers were inactive in the market last week, the trade generally having anticipated the event. American deliveries, which amounted to 5345 tons, were restricted in volume due to existence of the shipping strike. With trading quiet, prices tended downward, and spot Straits metal at New York is quotable today at 51.37½c. a lb., compared with 52.00c. a week ago. London prices are £230 5s. standard cash and £229 15s. three-months. The Eastern price is £233 2s. 6d.

Average Prices for November

Electrolytic copper, Conn.	10.413c. a lb.
Lake copper, Eastern delivery	10.538c. a lb.
Straits tin, spot, N. Y.	51.407c. a lb.
Zinc, East St. Louis	4.980c. a lb.
Zinc, New York	5.355c. a lb.
Lead, St. Louis	4.963c. a lb.
Lead, New York	5.113c. a lb.

IRON AND STEEL SCRAP

. . . Composite at $16.17 for third consecutive week.

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. . . Heavy buying at Pittsburgh; strength maintained at Detroit

HEAVY purchasing has appeared in the important Pittsburgh and Chicago areas, but prices, although pointing upward, have yet made no definite move. The eastern Pennsylvania district is strong in undertone but still fails to show much buying support, and the Detroit market so far shows no weakness despite the flood of scrap coming out of automobile assembly plants. No price changes for important grades have been made during the past week, and the composite figure therefore is unchanged for the third consecutive week at $16.17 a gross ton. Information from all important districts indicates that holders of scrap may soon be able to advance quotations without running the danger of discouraging buying. Such action may be of such magnitude as to force the composite above the peak level of $16.75, which was established for the period between Sept. 22 and Oct. 6.

Pittsburgh

Owing to the re-entrance into the market of a leading consumer after an absence of seven months, the market tone has become much stronger. During the past week quotations on No. 1 steel were substantiated by sales of approximately 25,000 tons at $17.50. This is the largest aggregate sale made for some time, and at least three consumers figured in on the total tonnage. Already dealers are paying $17.25 to cover on this order and in some cases $17.50 has been paid. There is a good possibility that the next large sale will be at a price higher than present quotations. Specialties are still exhibiting exceptional strength owing to the high rate of activity at steel foundries.

Chicago

Mill resistance to existing prices has broken down and sales are relatively free with all factors pointing to higher quotations. Railroad offerings have been heavy in recent days but consumption is also very heavy, and if more steel mill grades are to be directed into this market it seems certain that price offers will have to be raised. Most specialties are undergoing price advances which in no manner are checks against users' willingness to buy. Bidding is active for borings and turnings, the two grades that will be accumulated at local docks for water movement in the spring.

Cleveland

The market remains quiet and little business is expected this month as consumers generally have good stocks. Prices remain unchanged but are untested in the absence of consumer purchases. Dealers are cleaning up on old orders and scrap appears fairly plentiful although the cold weather the past week has curtailed shipment somewhat. Cast scrap is in good demand, scarce and higher.

New York

Mills are showing a bit more interest in making commitments, and the market's undertone has strengthened further. Demand is insufficient, however, to have effected change in dealers' buying prices. At existing levels supplies are coming out less freely than formerly, and certain interests claim to be encountering difficulty in covering short positions. Heavy melting steel is moving moderately to Bethlehem and Coatesville, Pa. The export market remains depressed. England is showing no interest over here, while recent inquiry from Italy has fallen about $1 under the market now in force here. Japan has closed a few contracts averaging in the neighborhood of 1000 tons each, but remains aloof to volume buying.

Buffalo

A local mill has purchased 5000 tons of No. 2 steel, paying a top price of $15, 50c. above the last recent purchase of this material. Another consumer has purchased a considerable tonnage of cupola cast scrap, paying $14.50. The market continues strong.

Boston

For Pittsburgh delivery No. 1 and 2 steel and scrap rails are priced higher, but not moving well. Blast furnace scrap, steel turnings and bundled skeleton are firmer. The American Steel & Wire Co., Worcester, offers to buy one car of No. 2 steel with every two cars of No. 1 available, at $11.25 and $12.25 a ton respectively. However, little material is being obtained. Foundries continue to take textile and No. 1 machinery cast, generally at $13 to $13.50 a ton, delivered Massachusetts points. Japan and Italy want No. 1 and No. 2 steel at $12 and $11 respectively, delivered Army Base, but Italy's credit is not particularly good. However, 3484 tons recently left here for Genoa, another cargo is loading and a third is due shortly. Providence exporters, feeling that higher prices are in the offing, are stocking material.

Philadelphia

The market remains inactive this week, but sentiment has been growing steadily stronger. The flow of material at current price levels is very light. In the absence of recent sales, prices are unchanged, but an upward move is believed to be waiting only for a transaction. Shipments on old orders are heavy and most district mills are said to have fair scrap piles on hand for the beginning of the winter.

Detroit

Bids on two large lists issued by Chrysler and Chevrolet were well in line with present quoted prices and few changes have been made over the past week. Surprise is expressed that the market continues to be as strong as it is since the shipping season is practically over and scrap will have to carry the rail rates to out-of-town points, thus tending to depress local prices. Scrap is coming out of the large automobile plants in huge volume despite the tendency to keep scrap losses on stampings down to approximately 10 per cent of incoming steel, compared with 20 per cent a few years back. Labor troubles, if continued in parts plants, are bound ultimately to have some effect upon scrap supply and prices.

St. Louis

The advance of $1 a ton in the price of pig iron has had no effect on this market. Prices were unchanged. There were no sales of consequence during the week, but several large deals are pending. The St. Louis-San Francisco Railway will scrap 25 locomotives, 673 freight and 8 passenger cars and 15 units of work equipment.

Cincinnati

Sales of foundry grades, although individually small, continue in large volume in the aggregate. Mill interest is still negligible and dealers hold on to supplies in anticipation of improved demand after the turn of the year. Bids on foundry scrap have advanced 50c. as dealers compete actively to cover on current business. The market undertone is strong, but prices on steel grades have received no recent test.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$17.00 to $17.50
No. 2 hvy. mltng. steel.	15.00 to 16.00
No. 2 RR. wrought	17.00 to 17.50
Scrap rails	17.50 to 18.00
Rails, 3 ft. and under	20.00 to 20.50
Comp. sheet steel	17.00 to 17.50
Hand. bundled sheets	16.00 to 16.50
Hvy. steel axle turn.	15.50 to 16.00
Machine shop turn.	11.50 to 12.00
Short shov. turn.	12.00 to 12.50
Mixed bor. & turn.	11.50 to 12.00
Cast iron borings	12.50 to 13.00
Cast iron carwheels	17.00 to 17.50
Hvy. breakable cast	14.50 to 15.00
No. 1 cast	16.00 to 16.50
RR. knuckles & cplrs.	20.50 to 21.00
Rail coil & leaf springs	20.50 to 21.00
Rolled steel wheels	20.50 to 21.00
Low phos. billet crops.	21.50 to 22.00
Low phos. sh. bar	21.00 to 21.50
Low phos. punchings	20.50 to 21.00
Low phos. plate scrap.	20.50 to 21.00
Steel car axles	19.50 to 20.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$15.50 to $16.00
No. 2 hvy. mltng. steel.	14.50 to 15.00
Comp. sheet steel	15.00 to 15.50
Light bund. stampings	11.50 to 12.00
Drop forge flashings	14.50 to 15.00
Machine shop turn.	10.50 to 11.00
Short shov. turn.	11.00 to 11.50
No. 1 busheling	14.50 to 15.00
Steel axle turnings	12.00 to 12.50
Low phos. billet crops	19.00 to 19.50
Cast iron borings	11.00 to 11.50
Mixed bor. & turn.	11.00 to 11.50
No. 2 busheling	11.00 to 11.50
No. 1 cast	18.00 to 18.50
Railroad grate bars	9.00 to 9.50
Stove plate	9.00 to 9.50
Rails under 3 ft.	19.00 to 19.50
Rails for rolling	16.50 to 17.00
Railroad malleable	17.75 to 18.00
Cast iron carwheels	.... 15.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$14.50 to $15.00
No. 2 hvy. mltng steel.	13.50 to 14.00
Hydraulic bund., new	15.00 to 15.50
Hydraulic bund., old	12.50 to 13.00
Steel rails for rolling	17.00 to 17.50
Cast iron carwheels	16.50 to 17.00
Hvy. breakable cast	.... 15.50
No. 1 cast	16.50 to 17.00
Stove plate (steel wks.)	.... 12.50
Railroad malleable	.... 16.50
Machine shop turn.	9.50 to 10.00
No. 1 blast furnace	8.50 to 9.00
Cast borings	8.00 to 8.50
Heavy axle turnings	12.50 to 13.00
No. 1 low phos. hvy.	20.00 to 20.50
Couplers & knuckles	19.50 to 20.00
Rolled steel wheels	19.50 to 20.00
Steel axles	20.50 to 21.00
Shafting	20.50 to 21.00
No. 1 RR. wrought	16.00 to 16.50
Spec. iron & steel pipe.	13.50 to 14.00
Bundled sheets	14.00 to 14.50
No. 1 forge fire	14.50 to 15.00
Cast borings (chem.)	10.50 to 13.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel.	$16.25 to $16.75
Auto. hvy. mltng. steel.	14.00 to 14.50
Alloy free	15.00 to 15.50
Shoveling steel	16.25 to 16.75
Hydraul. comp. sheets.	15.50 to 16.00
Drop forge flashings	14.00 to 14.50
No. 1 busheling	14.75 to 15.25
Rolled carwheels	18.50 to 19.00
Railroad tires, cut	18.50 to 19.00
Railroad leaf springs	18.00 to 18.50
Axle turnings	15.00 to 15.50
Steel coup. & knuckles	18.00 to 18.50
Coil springs	19.50 to 20.00
Axle turn. (elec.)	16.00 to 16.50
Low phos. punchings	19.00 to 19.50
Low phos. plates, 12 in. and under	19.00 to 19.50
Cast iron borings	9.50 to 10.00
Short shov. turnings	10.50 to 11.00
Machine shop turn.	8.50 to 9.00
Rerolling rails	17.00 to 17.50
Steel rails under 3 ft.	17.50 to 18.00
Steel rails under 2 ft.	19.00 to 19.50
Angle bars, steel	18.00 to 18.50
Cast iron carwheels	17.00 to 17.50
Railroad malleable	18.50 to 19.00
Agric. malleable	.... 15.00
	Per Net Ton
Iron car axles	$19.00 to $19.50
Steel car axles	18.50 to 19.00
No. 1 RR. wrought	$14.25 to $14.75
No. 2 RR. wrought	14.50 to 15.00
No. 2 busheling, old	6.00 to 6.50
Locomotive tires	13.00 to 13.50
Pipes and flues	10.00 to 10.50
No. 1 machinery cast	14.50 to 15.00
Clean auto. cast	13.50 to 14.00
No. 1 railroad cast	13.50 to 14.00
No. 1 agric. cast	11.00 to 11.50
Stove plate	8.75 to 9.25
Grate bars	10.50 to 11.00
Brake shoes	10.50 to 11.00

BUFFALO

Per gross ton, f.o.b. consumers' plants:

No. 1 hvy. mltng. steel.	$16.00 to $16.50
No. 2 hvy. mltng. steel.	14.50 to 15.00
Scrap rails	16.00 to 16.50
New hy. b'ndled sheets	14.50 to 15.00
Old hydraul. bundles	13.00 to 13.50
Drop forge flashings	14.50 to 15.00
No. 1 busheling	14.25 to 15.00
Hvy. axle turnings	10.50 to 11.00
Machine shop turn.	9.50 to 10.00
Knuckles & couplers	18.50 to 19.00
Coil & leaf springs	18.50 to 19.00
Rolled steel wheels	18.50 to 19.00
Low phos. billet crops.	18.50 to 19.00
Short shov. turnings	10.00 to 10.50
Mixed bor. & turn.	10.00 to 10.50
Cast iron borings	10.00 to 10.50
No. 2 busheling	11.00 to 11.50
Steel car axles	17.00 to 17.50
Iron axles	12.00 to 12.50
No. 1 machinery cast	15.00 to 15.50
No. 1 cupola cast	14.50 to 15.00
Stove plate	13.00 to 13.50
Steel rails under 3 ft.	17.50 to 18.00
Cast iron carwheels	15.50 to 16.00
Railroad malleable	17.00 to 18.00
Chemical borings	10.50 to 11.00

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel	$12.50 to $13.00
Scrap steel rails	12.50 to 13.00
Short shov. turnings	.... 8.00
Stove plate	.... 8.50
Steel axles	.... 15.00
Iron axles	.... 15.00
No. 1 RR. wrought	.... 10.00
Rails for rolling	.... 14.00
No. 1 cast	.... 13.50
Tramcar wheels	.... 13.00

ST. LOUIS

Dealer's buying prices per gross ton delivered to consumer:

Selected hvy. steel	$15.25 to $15.75
No. 1 hvy. melting	14.50 to 15.00
No. 2 hvy. melting	13.25 to 13.75
No. 1 locomotive tires	13.50 to 14.00
Misc. stand.-sec. rails	15.50 to 16.00
Railroad springs	16.75 to 17.25
Bundled sheets	9.50 to 10.00
No. 2 RR. wrought	15.00 to 15.50
No. 1 busheling	8.50 to 9.00
Cast bor. & turn.	5.50 to 6.00
Rails for rolling	16.75 to 17.25
Machine shop turn.	4.00 to 4.50
Heavy turnings	10.50 to 11.00
Steel car axles	17.00 to 17.50
Iron car axles	18.00 to 18.50
No. 1 RR. wrought	12.50 to 13.00
Steel rails under 3 ft.	13.00 to 13.50
Steel angle bars	15.50 to 16.00
Cast iron carwheels	14.00 to 14.50
No. 1 machinery cast	12.50 to 13.00
Railroad malleable	15.50 to 16.00
No. 1 railroad cast	12.50 to 13.00
Stove plate	7.50 to 8.00
Agricul. malleable	12.50 to 13.00
Grate bars	9.00 to 9.50
Brake shoes	11.25 to 11.75

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$14.00 to $14.50
No. 2 hvy. mltng. steel.	11.50 to 12.00
Scrap rails for mltng.	14.00 to 14.50
Loose sheet clippings	8.50 to 9.00
Bundled sheets	10.50 to 11.00
Cast iron borings	6.50 to 7.00
Machine shop turn.	7.50 to 8.00
No. 1 busheling	11.00 to 11.50
No. 2 busheling	6.50 to 7.00
Rails for rolling	15.00 to 15.50
No. 1 locomotive tires	12.50 to 13.00
Short rails	17.50 to 18.00
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	13.50 to 14.00
Burnt cast	9.50 to 10.00
Stove plate	9.50 to 10.00
Agricult. malleable	13.50 to 14.00
Railroad malleable	15.00 to 15.50

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$12.50 to $13.00
No. 2 hvy. m tng. steel.	11.75 to 12.25
Borings and turnings	8.75 to 9.25
Long turnings	8.25 to 8.75
Short shov. turnings	9.50 to 10.00
No. 1 machinery cast	14.50 to 15.00
Automotive cast	14.50 to 15.00
Hydraul. comp. sheets.	13.25 to 13.75
Stove plate	8.50 to 9.00
New factory bushel	12.00 to 12.50
Old No. 2 busheling	8.00 to 8.50
Sheet clippings	9.75 to 10.25
Flashings	12.00 to 12.50
Low phos. plate scrap.	13.00 to 13.50

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
No. 1 hvy. mltng. steel.	$10.75	$10.50
No. 2 hvy. mltng. steel.	9.75	9.25
Mixed dealers steel	7.75	7.75
Scrap pipe	6.75	6.50
Steel turnings	4.25	4.25
Cast iron turnings	4.75	4.50
Machinery cast	11.75	11.00
Dealers cast	10.75	10.00
Stove plate	7.25	6.75

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$16.75 to $17.25
Hydraulic bundles	16.00 to 16.50
Machine shop turn.	12.00 to 12.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$11.00 to $11.75
No. 2 hvy. mltng steel.	9.50 to 10.00
Hvy. breakable cast	10.50 to 11.00
No. 1 machinery cast.	11.50 to 11.75
No. 2 cast	10.50 to 10.75
Stove plate	.... 9.00
Steel car axles	16.00 to 17.00
Shafting	15.00 to 16.00
No. 1 RR. wrought	12.00 to 12.50
No. 1 wrought long	11.00 to 11.50
Spec. iron & steel pipe	10.50 to 11.00
Forge fire	8.00 to 8.50
Rails for rolling	11.50 to 12.00
Short shov. turnings	5.00 to 5.50
Machine shop turn.	5.00 to 5.50
Cast borings	5.00 to 5.50
No. 1 blast furnace	5.00 to 5.50
Cast borings (chem.)	10.00 to 11.00
Unprepar. yard scrap.	6.00 to 6.50

Per gross ton, delivered local foundries:

No. 1 machn. cast	$14.00 to $14.50
No. 1 hvy. cast cupola.	11.50 to 12.00
No. 2 cast	10.50 to 11.00

Add 25c. to 50c. to above quotations to secure North Jersey prices.

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$11.15 to $11.65
Scrap rails	11.15 to 11.65
No. 2 steel	9.15 to 9.65
Breakable cast	10.00 to 10.25
Machine shop turn.	.... 5.65
Unmixed bor. & turn.	.... 5.40
Bund. skeleton long	.... 9.80
Shafting	15.00 to 15.25
Cast bor. chemical	6.00 to 7.00

Per gross ton delivered consumers' yards:

Textile cast	$13.00 to $13.50
No. 1 machine cast	13.00 to 13.50
Stove plate	9.50 to 10.00

EXPORT

Dealers' buying prices per gross ton:

New York, delivered alongside barges

No. 1 hvy. mltng. steel.	.... $11.00
No. 2 hvy. mltng. steel.	.... 10.00
No. 2 cast	.... 10.00
Stove plate	.... 9.00
Rails (scrap)	$10.75 to 11.00

Boston on cars at Army Base or Mystic Wharf

No. 1 heavy melting steel.	$12.00
No. 2 heavy melting steel.	11.00
Rails (scrap)	12.50
Stove plate	7.75
Machine shop turn.	6.00

New Orleans, on cars at Stuyvesant Dock

No. 1 hvy. mltng. steel.	$12.60 to $12.75
No. 2 hvy. mltng. steel.	11.60 to 11.75

Los Angeles, on cars or trucks at local piers

No. 1 hvy. mltng. steel.	$10.50 to $11.00
Compressed bundles	8.50 to 9.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are $2 a ton higher, and delivered Detroit $3 higher.

	Per Gross Ton
Rerolling	$32.00 to $34.00
Forging quality	39.00 to 40.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or Bessemer	$32.00 to $34.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared 1.80c.

Wire Rods

(No. 5 to 15/32 in.)

	Per Gross Ton
F.o.b. Pittsburgh or Cleveland	$43.00
F.o.b. Chicago, Youngstown or Anderson, Ind.	44.00
F.o.b. Worcester, Mass.	45.00
F.o.b. Birmingham	46.00
F.o.b. San Francisco	52.00
F.o.b. Galveston	49.00

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh	2.05c. to 2.20c.
F.o.b. Chicago or Gary	2.10c. to 2.25c.
F.o.b. Duluth	2.20c. to 2.35c.
Del'd Detroit	2.20c. to 2.35c.
F.o.b. Cleveland	2.10c. to 2.25c.
F.o.b. Buffalo	2.15c. to 2.30c.
Del'd Philadelphia	2.36c. to 2.51c.
Del'd New York	2.40c. to 2.55c.
F.o.b. Birmingham	2.20c. to 2.35c.
F.o.b. cars dock Gulf ports	2.45c. to 2.60c.
F.o.b. cars Pacific ports	2.60c. to 2.75c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh	1.90c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill.	1.95c.
F.o.b. Buffalo	2.00c.
F.o.b. Birmingham	2.05c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.45c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	2.05c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	2.10c.
Del'd Detroit	2.20c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	1.90c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.30c.

Iron

F.o.b. Chicago	1.80c.
F.o.b. Pittsburgh (refined)	2.10c.
Delivered New York	2.05c.
Delivered Philadelphia	2.10c.

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	2.35c. to 2.55c.
F.o.b. Cleveland, Chicago and Gary	2.40c. to 2.60c.
F.o.b. Buffalo	2.45c. to 2.65c.
Del'd Detroit	2.50c. to 2.70c.
Del'd eastern Michigan	2.55c. to 2.75c.

*In quantities of 10,000 to 19,999 lb.

Plates

	Base per Lb.
F.o.b. Pittsburgh	1.90c. to 2.05c.
F.o.b. Chicago or Gary	1.95c. to 2.10c.
Del'd Cleveland	2.095c. to 2.245c.
F.o.b. Coatesville or Spar. Pt.	2.00c. to 2.15c.
Del'd Philadelphia	2.09c. to 2.24c.
Del'd New York	2.19c. to 2.34c.
F.o.b. Birmingham	2.05c. to 2.20c.
F.o.b. cars dock Gulf ports	2.30c. to 2.45c.
F.o.b. cars dock Pacific ports	2.45c. to 2.60c.
Wrought iron plates, f.o.b. Pittsburgh	3.20c.

Floor Plates

F.o.b. Pittsburgh	3.45c.
F.o.b. Chicago	3.50c.
F.o.b. Coatesville	3.55c.
F.o.b. cars dock Gulf ports	3.85c.
F.o.b. cars dock Pacific ports	4.00c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	1.90c. to 2.05c.
F.o.b. Chicago	1.95c. to 2.10c.
Del'd Cleveland	2.095c. to 2.245c.
F.o.b. Buffalo or Bethlehem	2.00c. to 2.15c.
Del'd Philadelphia	2.115c. to 2.265c.
Del'd New York	2.1625c. to 2.3125c.
F.o.b. Birmingham (standard)	2.05c. to 2.20c.
F.o.b. cars dock Gulf ports	2.30c. to 2.45c.
F.o.b. cars dock Pacific ports	2.45c. to 2.60c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.25c. to 2.40c.
F.o.b. Chicago or Buffalo	2.35c. to 2.50c.
F.o.b. cars dock Gulf or Pacific Coast ports	2.70c. to 2.85c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb. per gross ton	$39.00
Angle bars, per 100 lb.	2.55c. to 2.70c.

F.o.b. Basing Points

Light rails (from billets) per gross ton	$35.00
Light rails (from rail steel) per gross ton	34.00

	Base per 100 Lb.
Spikes	2.75c. to 2.90c.
Tie plates, steel	2.00c. to 2.10c.
Tie plates, Pacific Coast ports	2.10c. to 2.20c.
Track bolts, to steam railroads	3.75c. to 4.00c.
Track bolts, to jobbers, all sizes (per 100 counts) 70 per cent off list	

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	2.15c.
No. 10, f.o.b. Gary	2.25c.
No. 10, del'd Detroit	2.35c.
No. 10, del'd Philadelphia	2.46c.
No. 10, f.o.b. Birmingham	2.30c.
No. 10, f.o.b. cars dock Pacific ports	2.70c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.80c.
No. 24, f.o.b. Gary	2.90c.
No. 24, del'd Detroit	3.00c.
No. 24, del'd Philadelphia	3.11c.
No. 24, f.o.b. Birmingham	2.95c.
No. 24, f.o.b. cars dock Pacific ports	3.45c.
No. 24, wrought iron, Pittsburgh	4.50c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.80c.
No. 10 gage, f.o.b. Gary	2.90c.
No. 10 gage, f.o.b. Detroit	3.00c.
No. 10 gage, del'd Philadelphia	3.11c.
No. 10 gage, f.o.b. Birmingham	2.95c.
No. 10 gage, f.o.b. cars dock Pacific ports	3.40c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	3.25c.
No. 20 gage, f.o.b. Gary	3.35c.
No. 20 gage, del'd Detroit	3.45c.
No. 20 gage, del'd Philadelphia	3.56c.
No. 20 gage, f.o.b. Birmingham	3.40c.
No. 20 f.o.b. cars dock Pacific ports	3.80c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh	3.40c.
No. 24, f.o.b. Gary	3.50c.
No. 24, del'd Philadelphia	3.71c.
No. 24, f.o.b. Birmingham	3.55c.
No. 24, f.o.b. cars dock Pacific ports	4.00c.
No. 24, wrought iron, Pittsburgh	5.15c.

Electrical Sheets

(F.o.b. Pittsburgh)

	Base per Lb
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Special Motor	5.10c.
Special Dynamo	5.80c.
Transformer	6.30c.
Transformer Special	7.30c.
Transformer Extra Special	7.80c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extras plus 25c. per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.70c.
F.o.b. Gary	3.80c.
F.o.b. cars dock Pacific ports	4.40c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.20c.
No. 20, f.o.b. Gary	3.30c.
No. 20, f.o.b. Birmingham	3.80c.
No. 20, f.o.b. cars dock Pacific ports	3.80c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.95c.
No. 28, Gary	3.05c.
No. 28, cars dock Pacific ports	3.55c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. Pittsburgh district mill	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., Pittsburgh	1.95c. to 2.15c.
All widths up to 24 in., Chicago	2.05c. to 2.25c.
All widths up to 24 in., del'd Detroit	2.15c. to 2.35c.
All widths up to 24 in., Birmingham	2.10c. to 2.30c.
Cooperage stock, Pittsburgh	2.05c. to 2.25c.
Cooperage stock, Chicago	2.15c. to 2.35c.

Cold-Rolled Strips*

	Base per Lb.
F.o.b. Pittsburgh	2.60c. to 2.80c.
F.o.b. Cleveland	2.60c. to 2.80c.
Del'd Chicago	2.895c. to 3.095c.
F.o.b. Worcester	2.80c. to 3.00c.

* Carbon 0.25 and less.

Cold-Rolled Spring Steel

	Pittsburgh and Cleveland	Worcester
Carbon 0.25-0.50%	2.60c.†	2.80c.†
Carbon .51- .75	3.70c.†	3.90c.†
Carbon .76-1.00	5.45c.†	5.65c.†
Carbon Over 1.00	7.50c.†	7.70c.†

Fender Stock

No. 14, Pittsb'gh or Cleveland	2.90c.†
No. 14, Worcester	3.30c.†
No. 20, Pittsb'gh or Cleveland	3.30c.†
No. 20, Worcester	3.70c.†

† Prices range from values shown to values 0.20c. higher.

WIRE PRODUCTS

(Carload) lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Spring wire	3.20c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $2 a ton above, Birmingham $3 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	$2.25
Smooth coated nails	2.25

	Base per 100 Lb.
Annealed fence wire	$2.80 to $2.90
Galvanized fence wire	3.15 to 3.30
Polished staples	2.95
Galvanized staples	3.20
Barbed wire, galvanized	2.75
Twisted barbless wire	2.75
Woven wire fence, base column	$63.00
Single loop bale ties, base column	$55.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., mill prices are $2 a ton over Pittsburgh except for woven wire fence, which is $3 over Pittsburgh and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of $6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel In.	Black	Galv.	*Wrought Iron* In.	Black	Galv.
⅛	.57	37	⅛	+91½	+138
¼ to ⅜	.60	44½	¼ & ⅜	+1½	+21½
½	.64½	55	½	.31½	15
¾	.67½	59	¾	.36½	20½
1 to 3	.69½	61½	1 & 1¼	.39½	25½
			1½	.43½	28
			2	.41½	26

Lap Weld

2	.62	53½	2	.37	22½
2½ to 3.65		56½	2½ to 3½	38	25
3½ to 6.67		58½	4 to 8	.40	28½
7 & 8.66		56½	9 to 12	.38	24½
9 & 10.65		56			
11 & 12.64		55			

Butt Weld, extra strong, plain ends

⅛	.55½	42½	⅛	+13	+45½
¼ to ⅜	.57½	46½	¼ & ⅜	+2½	+34½
½	.62½	54½	½	.32½	17½
¾	.66½	58½	¾	.37½	22½
1 to 3	.68	61	1 to 2	.43½	29

Lap Weld, extra strong, plain ends

2	.60	52½	2	.40	26
2½ to 3.64		56½	2½ to 4.45	½	33
3½ to 6.67	½	60	4½ to 6.45		33½
7 & 8.	.66½	57	7 & 8	.46	33
9 & 10.	.65½	56	9 to 12.41	½	30
11 & 12.	.64½	55			

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 8.60	$ 7.82
1¼ in. o.d.	13 B.W.G.	10.19	9.26
1½ in. o.d.	13 B.W.G.	11.26	10.23
1¾ in. o.d.	13 B.W.G.	12.81	11.64
2 in. o.d.	13 B.W.G.	14.35	13.04
2¼ in. o.d.	13 B.W.G.	16.00	14.54
2½ in. o.d.	12 B.W.G.	17.61	16.01
2¾ in. o.d.	12 B.W.G.	19.29	17.54
2¾ in. o.d.	12 B.W.G.	20.45	18.59
3 in. o.d.	12 B.W.G.	$21.45	$19.50
4½ in. o.d.	10 B.W.G.	41.08	37.35
3½ in. o.d.	11 B.W.G.	27.09	24.62
4 in. o.d.	10 B.W.G.	33.60	30.54
4½ in. o.d.	10 B.W.G.	41.08	37.35
5 in. o.d.	9 B.W.G.	51.56	46.87
6 in. o.d.	7 B.W.G.	79.15	71.90

Extra for less-carload quantities:

25,000 lb.	or ft. to	39,999 lb.	or ft.	5 %
12,000 lb.	or ft. to	24,999 lb.	or ft.	12½ %
6,000 lb.	or ft. to	11,999 lb.	or ft.	25 %
2,000 lb.	or ft. to	5,999 lb.	or ft.	35 %
Under 2,000 lb.	or ft.			50 %

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago.	$48.40
6-in. and larger, del'd New York	48.00
*6-in. and larger, Birmingham	40.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	48.00
F.o.b. dock, Seattle	40.50
F.o.b. dock, Seattle	51.50

Class "A" and gas pipe, $3 extra.
4-in. pipe is $3 a ton above 6-in.

* Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $39. Birmingham, and $47.40, delivered Chicago and 4-in. pipe, $42, Birmingham, and $50.40 a ton, delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
½ in. x 6 in. and smaller	70 and 10
Larger than ½ in.	70 and 5
Lag bolts	70 and 5
Plow bolts, Nos. 1, 2, 3, and 7 heads	70 and 5
Hot-pressed nuts, blank or tapped, square	70 and 5
Hot-pressed nuts, blank or tapped, hexagon	70 and 5
C.p.c. and t. square or hex. nuts, blank or tapped	70 and 5
Semi-finished hexagon nuts, U.S.S. and S.A.E., all sizes	60, 20 and 10
Stove bolts in packages, nuts attached	75
Stove bolts in packages, with nuts separate	75 and 5
Stove bolts in bulk	82½
Tire bolts	50 and 5

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland	$3.05
F.o.b. Chicago or Birmingham	3.15

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh	70 and 5
F.o.b. Cleveland	70 and 5
F.o.b. Chicago and Birm'g'm.	70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lbs. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller	50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread ¾ in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	75
Milled studs	65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, $51 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade, base 2.55c. to 2.75c.
Delivered, Detroit 2.70c. to 2.90c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (½% Nickel)	$0.25
2100 (2½% Nickel)	0.95
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30) Molybdenum (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.10c.
6100 Chromium Vanadium Spring Steel	0.70
Chromium Nickel Vanadium	1.40
Carbon Vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric turned steel is 50c. higher. The differential for cold-drawn bars ½c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.05c. to 3.25c. base per lb. Delivered Detroit, 3.20c. to 3.40c.

STAINLESS STEEL No. 302

(17 to 19% Cr, 7 to 9% Ni, 0.08 to 0.20% C.)

(Base Prices f.o.b. Pittsburgh)

	Per Lb.
Forging billets	19.55c.
Bars	23c.
Plates	26c.
Structural shapes	23c.
Sheets	33c.
Hot-rolled strip	20¾c.
Cold-rolled strip	27c.
Drawn wire	23c.

TOOL STEEL

	Base per Lb.
High speed	57½c.
High carbon chrome	37c.
Oil hardening	21c.
Special	19c.
Extra	15¾c.
Regular	12½c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Based on Exchange rate as of Dec. 1

Ferromanganese, export	$45.58
Billets, open-hearth	29.74 to $31.01
Tin plate, per base box	4.74 to 4.84
Steel bars, open-hearth	39.87
Beams, open-hearth	38.61
Channels, open-hearth	39.87
Angles, open-hearth	38.61
Black sheets, No. 24 gage	51.66
Galvanized sheets, No. 24 gage	61.50

CONTINENTAL

Per Metric Ton, f.o.b. Continental Ports

Based on Exchange rate of Dec. 1

Billets, Thomas	$19.27
Wire rods, No. 5 B.W.G.	36.90
Steel bars, merchant	26.64
Sheet bars	19.68
Plate, ¼ in. and up	35.42
Plate, 3/16 in. and 5 mm	34.85
Sheets, ⅛ in.	36.90
Beams, Thomas	25.58
Angles (Basic)	25.58
Hoops and strip base	32.79
Wire, plain, No. 8	44.03
Wire nails	47.15
Wire, barbed, 4 pt. No. 10 B.W.G.	71.74

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH

	Base per Lb.
Plates	3.25c.
Structural shapes	3.25c.
Soft steel bars and small shapes	3.15c.
Reinforcing steel bars	3.15c.
Cold-finished and screw stock:	
Rounds and hexagons	3.60c.
Squares and flats	3.60c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	3.30c.
Hoops	3.80c
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.45c.
Galv. sheets (No. 24), 25 or more bundles	4.05c.
Hot-rolled sheets (No. 10)	3.05c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$3.77
Spikes, large	3.25c.
	Per Cent Off List
Track bolts, all sizes, per 100 count	60
Machine bolts, 100 count	65-5
Carriage bolts, 100 count	65-5
Nuts, all styles, 100 count	65-5
Large rivets, base per 100 lb.	$3.65
Wire, black, soft ann'l'd, base per 100 lb.	3.05c.
Wire, galv. soft, base per 100 lb.	3.40c.
Common wire nails, per keg	2.30c.
Cement coated nails, per keg.	2.30c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, rounds	3.20c.
Soft steel bars, squares and hexagons	3.35c.
Cold-fin. steel bars:	
Rounds and hexagons	3.75c.
Flats and squares	3.75c.
Hot-rolled strip	3.40c.
Hot-rolled annealed sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.65c.
Spikes (keg lots)	3.85c.
Track bolts (keg lots)	4.85c.
Rivets, structural (keg lots)	3.80c.
Rivets, boiler (keg lots)	3.90c.
	Per Cent Off List
Machine bolts	*65
Carriage bolts	*65
Lag screws	*65
Hot-pressed nuts, sq. tap or blank	*65
Hot-pressed nuts, hex. tap or blank	*65
Hex. head cap screws	60
Cut point set screws	75 and 10
Flat head bright wood screws	62 and 20
Spring cotters	55
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57½
Wrought washers	$4.50 off list
Black ann'l'd wire per 100 lb.	$3.95
Com. wire nails, 50 kegs or more	2.50c.†
Cement c't'd nails, 50 kegs or more	2.50c.†

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. All prices are f.o.b. consumers' plants wihtin the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 65 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

†Prices for city and suburbs only.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	3.50c.
Structural shapes	3.47c.
Soft steel bars, rounds	3.51c.
Iron bars, Swed. charcoal	6.75c. to 7.00c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.06c.
Flats and squares	4.06c.
Cold-rolled; strip, soft and quarter hard	3.36c.
Hoops	3.66c.
Bands	3.66c.
Hot-rolled sheets (No. 10)	3.15c. to 3.41c.
Hot-rolled ann'l'd sheets (No. 24*)	3.75c. to 4.10c.
Galvanized sheets (No. 24*)	4.10c. to 4.50c.
Long terne sheets (No. 24)	5.25c. to 5.35c.
Armco iron, galv. (No. 24†)	5.65c.
Toncan iron, galv. (No. 24†)	5.65c.
Galvannealed (No. 24†)	5.75c.
Armco iron, hot-rolled annealed (No. 24†)	5.10c.
Toncan iron, hot-rolled annealed (No. 24†)	5.10c.
Armco iron hot-rolled (No. 10†)	4.15c.
Toncan iron, hot-rolled (No. 10†)	4.15c.
Cold-rolled sheets (No. 20) less than 1000 lbs.	
Standard quality	4.65c.
Deep drawing	5.40c.
Stretcher leveled	5.40c.
SAE, 2300, hot-rolled	6.97c.
SAE, 3100, hot-rolled	5.37c.
SAE, 6100, hot-rolled, annealed	9.57c.
SAE, 2300, cold-rolled	8.03c.
SAE, 3100, cold-rolled, annealed	7.43c.
Floor plate ⅛ in. and heavier	5.30c.
Standard tool steel	11.25c.
Wire, black annealed (No. 9)	3.50c.
Wire, galv. (No. 9)	3.85c.
Tire steel, 1 x ½ in. and larger	3.85c.
Open-hearth spring steel	4.00c. to 10.00c.
Common wire nails, base per keg	$3.21
	Per Cent Off List
Machine bolts, square head and nut:	
All diameters	65 and 10
Carriage bolts, cut thread:	
All diameters	65 and 10

* No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

† 125 lb. and more.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.55c.
Bars, soft steel (rounds and flats)	3.45c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.60c.
Cold-fin. rounds, shafting, screw stock	4.00c.
Hot-rolled annealed sheets (No. 24)	4.30c.
Galv. sheets (No. 24)	4.90c.
Hot-rolled sheets (No. 10)	3.40c.
Black corrug. sheets (No. 24)	4.30c.
*Galv. corrug. sheets	4.90c.
Structural rivets	4.15c.
Boiler rivets	4.25c.
	Per Cent Off List
Tank rivets, 7/16 in. and smaller.	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	65

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	3.10c.
*Structural shapes	3.10c.
*Soft steel bars, small shapes, iron bars (except bands)	3.25c.
‡Reinforc. steel bars, sq. twisted and deformed	3.01c.
Cold-finished steel bars	4.01c.
*Steel hoops	3.55c.
*Steel bands, No. 12 and 3/16 in. incl.	3.30c.
Spring steel	5.00c.
†Hot-rolled anneal. sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.50c.
*Hot-rolled annealed sheets (No. 10)	3.20c.
Diam. pat. floor plates, ¼ in.	5.05c.
Swedish iron bars	6.25c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.

‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.41c.
Soft steel bars	3.10c.
‡Reinforc. steel bars	2.10c.
†Cold-finished steel bars	3.75c.
Flat-rolled steel under ¼ in.	3.46c.
Cold-finished strip	†3.00c.
Hot-rolled annealed sheets (No. 24)	3.91c.
Galvanized sheets (No. 24)	4.61c.
Hot-rolled sheets (No. 10)	3.21c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.46c.
*Black ann'l'd wire, per 100 lb.	$2.80
*No. 9 galv. wire, per 100 lb.	3.15
*Com. wire nails, base per keg	2.25

†Outside delivery 10c. less.

*For 5000 lb. or less.

‡Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.52c.
Floor plates	5.27c.
Bars, rounds, flats and angles.	3.42c.
Other shapes	3.57c.
Rail steel reinforc. bars	3.25c.
Hoops and bands, 3/16 in. and lighter	3.57c.
Cold-finished bars	3.97c.
Hot-rolled annealed sheets (No. 24) 25 bundles or more.	3.72c.
Galv. sheets (No. 24) 3750 lb. or more	4.07c.
Galvanized sheets (No. 24) over 3500 lb.	4.07c.
Hot-rolled sheets (No. 10)	3.32c.
Structural rivets	4.50c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$2.88
Com. wire nails, base per keg:	
Any quantity less than carload.	3.04
Cement c't'd nails, base 100-lb keg	3.50
Chain. lin. per 100 lb.	8.35
	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$20.37
4-in.	48.14
Lap-welded steel boiler tubes, 2-in.	19.38
4-in.	45.32

BUFFALO

	Base per Lb.
Plates	3.48c.
Struc. shapes	3.35c.
Soft steel bars	3.25c.
Reinforcing bars	2.60c.
Cold-fin. flats and sq.	3.80c.
Rounds and hex.	3.80c.
Cold-rolled strip steel	3.19c.
Hot-rolled annealed sheets (No. 24)	4.26c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.53c.
Galv. sheet (No. 24)	4.80c.
Bands	3.53c.
Hoops	3.53c.
Heavy top-rolled sheets	3.28c.
Com. wire nails, base per keg.	$2.85
Black wire, base per 100 lb. (2500-lb. lots or under)	4.00
(Over 2500 lb.)	3.90

BOSTON

	Base per Lb
Channels, angles	3.65c.
Tees and zees, under 3"	3.90c.
H beams and shapes	3.64c.
Plates — Sheared, tank, and univ. mill, ¼ in. thick and heavier	3.66c.
Floor plates, diamond pattern	5.46c.
Bar and bar shapes (mild steel)	3.65c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.75c. to 4.75c.
Half rounds, half ovals, ovals and bevels	4.90c.
Tire steel	4.90c.
Cold-rolled strip steel	2.45c.
Cold-finished rounds, squares and hexagons	4.15c.
Cold-finished flats	4.10c.
Blue annealed sheets, No. 10 ga.	3.75c.
One pass cold-rolled sheets No. 24 ga.	4.30c.
Galvanized steel sheets, No. 24 ga.	4.30c.
Lead coated sheets, No. 24 ga.	5.95c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

	Base per Lb.
Soft steel bars	3.29c.
Structural shapes	3.52c.
Plates	3.52c.
Floor plates	5.27c.
Hot-rolled annealed sheets (No. 24)*	4.14c.
Hot-rolled sheets (No. 10)**	3.24c.
Galvanized sheets (No. 24)	4.82c.
Bands	3.49c.
Hoops	3.49c.
†Cold-finished bars	3.84c.
Cold-rolled strip	3.18c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	5.44c.
Bolts and nuts, in cases, 70 and 10 per cent off list	
Broken cases..65 and 10 per cent off	

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

* Base less 0.25c., 3500 lb. and over. Add 0.50c. per hundred lb. for broken bundles.

** Base less 0.25c., 1500 to 3749 lbs.; less 0.50c., 3750 to 7499 lb.; less 0.75c., 7500 lb. and over.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

Country territory to be equalized on the Chicago plan.

MILWAUKEE

	Base per Lb.
Plates and structural shapes	3.41c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.31c.
Soft steel bars, squares and hexagons	3.46c.
Hot-rolled strip	3.51c.
Hot-rolled sheets (No. 10)	3.26c.
Hot-rolled annealed sheets (No. 24)	4.16c.
Galvanized sheets (No. 20)	4.76c.
Cold-finished steel bars	3.76c.
Cold-rolled strip	3.33c.
Structural rivets (keg lots)	4.01c.
Boiler rivets, cone head (keg lots)	4.11c.
Track spikes (keg lots)	4.06c.
Track bolts (keg lots)	5.06c.
Black annealed wire	3.40c.
Com. wire nails	2.60c.
Cement coated nails	2.60c.

	Per Cent Off List
Machine bolts carriage bolts and lag screws	70 to 75
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots)	70

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	3.45c.
Structural shapes	3.55c.
Plates	3.55c.
Cold-finished bars	4.00c.
Bands and hoops	3.65c.
Hot-rolled annealed sheets, No. 24	4.30c.
Galvanized sheets, No. 24	4.90c.

On mild steel bars, shapes, plates and hoops and bands the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BALTIMORE

	Base per Lb.
Mild steel bars and small shapes	3.20c.
Structural shapes	3.10c.
Reinforcing bars	....prices on application
Plates	3.10c.
Hot-rolled sheets, No. 10	3.20c.
Bands	3.30c.
Hoops	3.55c.
Special threading steel	3.20c.
Diamond pattern floor plates ¼ in. and heavier	5.10c.
Galvanized bars and small shapes	5.70c.
Galvanized bands	5.80c.
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	3.88c.

All prices are for 2000 lb. and more.

For second zone add 10c. per 100 lb. for trucking.

List size extras of Aug. 15, 1935, and cutting extras to be added.

For cold-rolled products, list size extras from Jan. 1, 1936, and cutting extras to be added.

CHATTANOOGA

	Base per Lb.
Mild steel bars	3.46c.
Iron bars	3.46c.
Reinforcing bars	3.46c.
Structural shapes	3.66c.
Plates	3.66c.
Hot-rolled sheets No. 10	3.46c.
Hot-rolled annealed sheets, No. 24*	3.41c.
Galvanized sheets No. 24*	3.96c.
Steel bands	3.71c.
Cold-finished bars	4.281c.

* Plus mill item extra.

MEMPHIS

	Base per Lb.
Mild steel bars	3.57c.
Shapes, bar size	3.57c.
Iron bars	3.57c.
Structural shapes	3.77c.
Plates	3.77c.
Hot-rolled sheets, No. 10	3.57c.
Hot-rolled annealed sheets, No. 24	4.37c.
Galvanized sheets, No. 24	5.07c.
Steel bands	3.82c.
Cold-drawn rounds	4.04c.
Cold-drawn flats, squares, hexagons	6.04c.
Structural rivets	4.25c.
Bolts and nuts, per cent off list	65
Small rivets, per cent off list	50

NEW ORLEANS

	Base per Lb.
Mild steel bars	3.45c.
Reinforcing bars	3.50c.
Structural shapes	3.65c.
Plates	3.65c.
Hot-rolled sheets, No. 10	3.65c.
Hot-rolled annealed sheets, No. 24	4.35c.
Galvanized sheets, No. 24	4.95c.
Steel bands	4.05c.
Cold-finished steel bars	4.55c.
Structural rivets	4.25c.
Boiler rivets	4.25c.
Common wire nails, base per keg	$2.45
Bolts and nuts, per cent off list	70

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.60c.	3.80c.	3.65c.
Shapes, standard	3.60c.	3.80c.	3.65c.
Soft steel bars	3.60c.	3.80c.	3.90c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.45c.	2.45c.	2.45c.
Hot - rolled annealed sheets (No. 24)	4.30c.	4.35c.	4.60c.
Hot-rolled sheets (No. 10)	3.70c.	3.90c.	3.85c.
Galv. sheets (No. 24 and lighter)	5.00c.	4.60c.	5.00c.
Galv. sheets (No. 22 and heavier)	5.00c.	4.80c.	5.00c.
Cold finished steel			
Rounds	6.05c.	6.10c.	6.00c.
Squares and hexagons	7.30c.	7.35c.	6.35c.
Flats	7.80c.	7.85c.	7.35c.
Common wire nails—base per keg less carload	$2.90	$2.90	$2.90

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
High-heat duty, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	$45.00
High-heat duty, New Jersey	50.00
High-heat duty, Ohio	40.00
Intermediate, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	40.00
Intermediate, New Jersey	43.00
Intermediate, Ohio	35.00
Ground fire clay, per ton	7.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$45.00
Chicago District	54.00
Birmingham	$48 to 50.00
Silica cement per net ton	8.00

Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$45.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	45.00

Magnesite Brick

	Per Net Ton
Standard f.o.b. Baltimore and Chester, Pa.	$65.00
Chemically bonded, f.o.b. Baltimore	55.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass. $21.50 to $22.75
F.o.b. Bethlehem, Birdsboro, and Swedeland, Pa., and Sparrows Point, Md. 21.50
Delivered Brooklyn 23.9289
Delivered Newark or Jersey City 22.9873
Delivered Philadelphia 22.3132
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill. 20.50
F.o.b. Jackson, Ohio 22.25
Delivered Cincinnati 20.82
F.o.b. Duluth 21.00
F.o.b. Provo, Utah 18.50
Delivered San Francisco, Los Angeles or Seattle 23.315
F.o.b. Birmingham* 16.88

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of .70 and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass. $21.00 to $22.25
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md. 21.00
F.o.b. Buffalo 19.50
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill. 20.00
Delivered Cincinnati 19.82
Delivered Canton, Ohio..... 21.3482
Delivered Mansfield, Ohio.... 21.8832
F.o.b. Jackson, Ohio..... 21.75
F.o.b. Provo, Utah 18.00
F.o.b. Birmingham 15.50

Bessemer

F.o.b. Everett, Mass. $22.50 to $23.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa. 22.50
Delivered Boston Switching District 24.00
Delivered Newark or Jersey City 23.9873
Delivered Philadelphia 23.3132
F.o.b. Buffalo and Erie, Pa., and Duluth 21.50
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago 21.00
F.o.b. Birmingham 22.00
Delivered Cincinnati 22.0807
Delivered Canton, Ohio..... 22.3482
Delivered Mansfield, Ohio.... 22.8832

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y. $25.00

Gray Forge

Valley or Pittsburgh furnace. $20.00

Charcoal

Lake Superior furnace $23.00
Delivered Chicago 26.2528

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75....$21.00
No. 2 fdy., sil. 1.75 to 2.75.... 20.50
Malleable 22.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75....$22.50
No. 2 fdy., sil. 1.75 to 2.25.... 22.00
Malleable 22.50
Basic 22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....$75.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$26.00
50-ton lots 3-mo. shipment.. 24.00
F.o.b. New Orleans 26.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads) $69.50
50% (ton lots) 77.00
75% (carloads) 126.00
75% (ton lots) 136.00

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 6.00 to 6.50% $22.75

For each additional 0.5% silicon up to 17%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

10.00 to 10.50%.....$27.75
10.51 to 11.00%..... 28.25
11.00 to 11.50%..... 28.75
11.51 to 12.00%..... 29.25
12.01 to 12.50%..... 29.75
12.51 to 13.00%..... 30.25
13.01 to 13.50%..... 30.75
13.51 to 14.00%..... 31.25
14.01 to 14.50%..... 31.75
14.51 to 15.00%..... 32.25
15.01 to 15.50%..... 32.75
15.51 to 16.00%..... 33.25
16.01 to 16.50%..... 33.75
16.51 to 17.00%..... 34.25

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads..... $1.30
Ferrotungsten, lots of 5000 lb. 1.35
Ferrotungsten, smaller lots 1.40
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract ..... 10.00c.
Ferrochromium, 2% carbon .....16.50c. to 17.00c.
Ferrochromium, 1% carbon .....17.50c. to 18.00c.
Ferrochromium, 0.10% carbon .....19.50c. to 20.00c.
Ferrochromium, 0.06% carbon .....20.00c. to 20.50c.
Ferrovanadium, del. per lb. contained V. .....$2.70 to $2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y. $2.50
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton $137.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton 142.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton 58.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with $3 unitage, freight equalized with Nashville, Tenn. 75.00
Ferromolybdenum, per lb. Mo del. ..... 95c.
Calcium molybdate, per lb. Mo del. ..... 80c.
Silico spiegel, per ton, f.o.b. furnace, carloads $38.00
Ton lots or less, per ton.... 43.00
Silico-manganese, gross ton, delivered.
2.50% carbon grade..... 85.00
2% carbon grade 90.00
1% carbon grade 100.00

Note: Spot prices are $5 a ton higher except on 75 per cent ferrosilicon on which premium is $10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%...$4.80
Old range, non-Bessemer, 51.50% 4.65
Mesabi, Bessemer, 51.50%..... 4.65
Mesabi, non-Bessemer, 51.50%.. 4.50
High phosphorus, 51.50%..... 4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria..13.00c. to 13.50c.
Iron, low phos., Swedish, average, 68½% iron .....Nominal
Iron, basic or foundry, Swedish, aver. 65% iron .....10.00c.
Iron, basic or foundry, Russian, aver. 65% iron.....Nominal
Man., Caucasian, washed 52% .....27c. to 30c.
Man., African, Indian, 44-48% .....25c to 30c.
Man., African, Indian, 49-51% .....27c. to 30c.
Man., Brazilian, 46 to 48½% .....Nominal..25c. to 30c.

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid delivered nominal .....$15.25 to $15.50
Tungsten, domestic, scheelite delivered, nominal 15.00

Per Gross Ton

Chrome, 45% Cr_2O_3, lamp, c.i.f. Atlantic Seaboard (African).$17.50
45 to 46% Cr_2O_3 (Turkish) $16.50 to 17.00
48% Cr_2O_3 (African)..... 20.50
48% min. Cr_2O_3 (Turkish).... 19.25
Chrome concentrate, 50% and over Cr_2O_3, c.i.f. Atlantic ports 22.00
52% Cr_2O_3 (Turkish) 21.75
48 to 49% Cr_2O_3 (Turkish).. 19.25

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail $18.00
Domestic, barge and rail..... 18.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines..... 19.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid..... 22.00
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines.... 35.00

FUEL OIL

Per Gal.

F.o.b. Bayonne or Baltimore No. 3 distillate ..... 4.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial ..... 3.75c.
Del'd Ch'go, No. 3 industrial 5.00c.
Del'd Ch'go, No. 5 industrial 3.77c.
Del'd Cleve'd, No. 3 distillate.. 6.00c.
Del'd Cleve'd No. 4 industrial 5.75c.
Del'd Cleve'd No. 5 industrial 5.00c.

COKE AND COAL

Coke *Per Net Ton*

Furnace, f.o.b. Connellsville, Prompt .....$3.75 to $4.00
Foundry, f.o.b. Connellsville, Prompt ..... 4.25 to 5.75
Foundry, by-product, Chicago ovens 9.00
Foundry, by-product, del'd New England ... 12.00
Foundry, by-product, del'd Newark or Jersey City ..... 9.60 to 10.05
Foundry, by-product, Philadelphia 9.85
Foundry, by-product, delivered Cleveland ... 10.30
Foundry, by-product, delivered Cincinnati .. 9.50
Foundry, Birmingham .. 6.50
Foundry, by-product, St. Louis, f.o.b. ovens. 8.00
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports 14.75

Coal *Per Net Ton*

Mine run steam coal, f.o.b. W. Pa. mines...$1.50 to $1.75
Mine run coking coal, f.o.b. W. Pa. ..... 1.75 to 1.90
Gas coal, ¾-in. f.o.b. Pa. mines ..... 2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines ..... 1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines ..... 1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines ..... 1.20 to 1.45

FABRICATED STEEL

. . . Lettings rise to 25,210 tons from 18,365 tons last week.

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. . . New projects in better volume at 29,225 tons as against 13,770 tons a week ago.

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. . . Plate awards total only 415 tons.

NORTH ATLANTIC STATES

Boston, 1700 tons, Liberty Mutual Insurance Co. building, to American Bridge Co.

Boston, 1200 tons, Dartmouth Corp. office building, to New England Structural Co., Everett, Mass.

Foxborough, Mass., 150 tons, State bridge to Boston Bridge Works, Inc., Cambridge, Mass.

Sharon, Mass., 100 tons, State bridge over New York, New Haven & Hartford tracks, to Boston Bridge Works, Inc.

North Haven, Conn., 220 tons, railroad bridge, to Bethlehem Steel Co.

Fairfield, Conn., 150 tons, highway bridge, to American Bridge Co.

New York, 157 tons, Bronx Eye and Ear Infirmary, to Joseph T. Ryerson & Son, Inc., New York.

Andes, N. Y., 100 tons, school, to Bethlehem Steel Co.

Elmira, N. Y., 145 tons, administration building, to Genesee Bridge Co., Rochester, N. Y.

Weedsport, N. Y., 240 tons, New York Central grade crossing elimination, to American Bridge Co.

Iselin, N. J., 250 tons, Pennsylvania Railroad bridge, to Phoenix Bridge Co., Phoenixville, Pa.

Princeton, N. J., 125 tons, theater, to Bethlehem Fabricators, Inc.

Tioga County, Pa., 200 tons, highway bridge, to American Bridge Co.

Bridgeville, Pa., 200 tons, plant extension, American Cyanamid & Chemical Corp., to Levinson Steel Co.

Ferndale, Pa., 400 tons, highway bridge, route 52, to Bethlehem Steel Co.

Baltimore, 2000 tons, transmission towers for Pennsylvania Water & Power Co., to Blaw-Knox Co., Pittsburgh.

SOUTH AND SOUTHWEST

State of North Carolina, 235 tons, Blue Ridge Parkway viaduct, to Virginia Bridge Co., Roanoke, Va.

Conway, S. C., 523 tons, bridge, to Phoenix Bridge Co.

Columbus, Ga., 293 tons, cotton warehouse, to Ingalls Iron Works Co., Birmingham.

State of Florida, 288 tons, railroad overpass for Atlantic Coastline and Seaboard Air Line, to Virginia Bridge & Iron Co.

Blountstown, Fla., 3500 tons, bridge, to Wisconsin Bridge & Iron Co.

Arcadia, Fla., 125 tons, overpass, to Virginia Bridge Co.

Birmingham, Ala., 650 tons, Kress store, to Ingalls Iron Works Co.

Albuquerque, N. M., 100 tons, library for University of Mexico, to Midwest Steel & Iron Co., Denver.

Parker Ridge, Ariz., 275 tons, bridge, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

CENTRAL STATES

Cincinnati, 2550 tons, Columbia Avenue viaduct, to Bethlehem Steel Co.

Youngstown, 480 tons, building for Youngstown Sheet & Tube Co., to Fort Pitt Bridge Works Co., Pittsburgh.

Youngstown, 770 tons, extension to Republic Steel Corp. buildings, to Lackawanna Steel Construction Corp., Buffalo.

Lafayette, Ind., 900 tons, bridge, to Vincennes Bridge Co., Vincennes, Ind.

Schererville, Ind., 400 tons, bridge, to Bethlehem Steel Co.

Chicago, 400 tons, Wendell-Phillips school, to Eggers Iron Works.

Pocahontas County, Iowa, 100 tons, bridge, to Pittsburgh-Des Moines Steel Co.

Bellevue, Iowa, 670 tons, dam, to American Bridge Co.

LeClaire, Iowa, 4075 tons, Mississippi River dam, to Bethlehem Steel Co.

Arkansas City, Kan., 520 tons, highway bridge, to Bethlehem Steel Co.

WESTERN STATES

Denver, 113 tons, State railroad overpass, to an unnamed bidder.

Denver, 100 tons, three bridges for Route Co., to an unnamed bidder.

San Diego, Cal., 140 tons, post office, to Bethlehem Steel Co.

Salt Lake City, Utah, 500 tons, bridge, to Bethlehem Steel Co.

Boise, Idaho, 153 tons, underpass, to American Bridge Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Cambridge, Mass., 200 tons, Lever Brothers unit.

Little Falls, N. H., 1225 tons, New York Central grade elimination.

New York, 1275 tons, Grand Central Parkway bridge.

New York, 575 tons, reconstruction New York Central bridge in Bronx.

Brooklyn, 375 tons, department store, Abraham and Strauss.

Medina, N. Y., 600 tons, factory building, H. J. Heinz Co.

Stapleton, N. Y., 475 tons, garage, Rubsam & Horrman Brewing Co.

Mexico, N. Y., 300 tons, Central School building.

Trenton, N. J., 700 tons, building for L. A. Young Spring & Wire Co.

Ambridge, Pa., 575 tons, building extension, Spang Chalfant & Co.

Keymar and Thurmont, Md., 350 tons, Western Maryland Railroad bridges.

Washington, 2500 tons, Apex building, Treasury Department.

SOUTH AND SOUTHWEST

Henderson, Ky., 260 tons, water works reservoir cover.

Louisville, Tenn., 600 tons, Louisville Gas & Electric Co.

Phoenix, Ariz., 212 tons, State highway bridge; bids Dec. 4.

CENTRAL STATES

Cleveland, 14,000 tons, strip sheet mill for Republic Steel Corp.

Cleveland, 200 tons, crane runway, Cleveland Brick & Clay Co.

Milwaukee, 1000 tons, Miller Brewing Co.

State of Missouri, 700 tons, bridges.

WESTERN STATES

San Francisco, 3000 tons, further construction in Hetch Hetchy water supply project; bids Dec. 9.

Monterey County, Cal., 100 tons, bridge; bids Dec. 16.

FABRICATED PLATES

AWARDS

Abington, Mass., 100 tons, standpipe, to Chicago Bridge & Iron Works.

Hastings, N. Y., 145 tons, six oil tanks, A. P. Milligan, to Hammond Iron Works, Warren, Pa.

Alloy, W. Va., 170 tons, 11 cleaning tables, Union Carbide Co., to Lackawanna Steel Construction Corp.

NEW PROJECTS

Everett, Wash., 6050 tons, water pipe line from Lake Chaplain; bids Dec. 9.

SHEET PILING

AWARDS

Revere, Mass., 970 tons, State sea wall, to Carnegie-Illinois Steel Corp.

Chester, Pa., 125 tons, Collins & Aikman Corp., to Bethlehem Steel Co.

Ronk, Pa., 100 tons, H-piles, to Bethlehem Steel Co.

NEW PROJECTS

Sewalls Point, Va., 1500 tons, bulkhead; bids Dec. 9 by Bureau of Supplies and Accounts, Navy Department.

Red Wing, Minn., unstated tonnage, dam No. 3, Mississippi River, bids by United States Engineers office, St. Paul, Dec. 18.

THIS WEEK'S MACHINE . . .TOOL ACTIVITIES. . .

. . . Good business continues in most centers, though volume is less than a few weeks ago.

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. . . Automobile companies still in the market; General Motors has extensive program.

Detroit

THE Detroit market continues to be featured by rather active demand for fill-in equipment to bolster up production lines. Most of this has been repeat business and has tended to keep the machine tool shops busy and has required little additional engineering work. One of the principal buyers in recent weeks has been the Packard Motor Car Co., which has just completed a large expansion program. The Ford Motor Co. also is actively engaged in building up its production from 5000 to 7000 units a day. Ford is also planning to spend $1,400,000 for new machinery in its Canadian plant at Windsor. The Dodge division of the Chrysler Corp. has been in the market for gear-cutting equipment to bolster up its schedules. Much gear-cutting equipment is also being sold to tractor plants. General Motors has been expected momentarily to close on machinery for a rather extensive program involved in the manufacture of a part of its requirements for universal joints. This machinery will probably be installed at the Saginaw Steering Gear Co., G.M. subsidiary, which has also been in the market for gear-cutting equipment in recent weeks.

Pittsburgh

OWING to the holiday, both inquiries and orders have not been as active as in the previous weeks. Deliveries are getting further behind and are now averaging 60 to 90 days, with the former an especially good promise. Machine tool dealers will benefit indirectly from recently placed steel mill equipment contracts. Rolling mill equipment manufacturers are working 24 hr. a day, seven days a week, and, as an indication of backlogs, one large contract placed during the past week was given a 10 to 12-month completion promise.

New York

BUSINESS continues good, with all sellers trying to settle as amicably as possible the problem of deliveries, which are steadily growing worse. Orders are diversified. All users of machine tools seem to be buying, and there is a fair amount of repeat and duplicate business.

Cleveland

A LEADING manufacturer has announced a 10 per cent price advance on turret lathes and tools, effective Dec. 8. Other machine tool manufacturers say that prices must be marked up because of higher manufacturing costs which will be further increased shortly by the advance in steel and pig iron prices. While November orders for turret lathes fell behind those of October, the volume of incoming business was larger than shipments, resulting in a further extension in deliveries. Orders for automatic screw machines also exceed shipments, and deliveries on these are being extended, now ranging from 30 days up to April 15.

Chicago

DEALERS are not complaining about the volume of new business, but they find that it has receded from the minor boom which followed the national election. The real problem at the moment is to pacify buyers who had received definite promises of delivery, but who now find that machine tool builders cannot perform as expected. New orders are spotty, and the market is characterized by lack of attractive railroad and industrial lists. It can be said, however, that fresh inquiries equal sales, thereby showing that future business is on a sound footing. Several railroads, among them the Milwaukee Road, are studying needs and may soon take preliminary figures on machine tools to be ordered in 1937.

St. Louis

THE St. Louis-San Francisco Railway has asked the Federal Court at St. Louis for authority to expend a total of $13,097 for shop machinery as follows: Three electric welding machines for shops at Springfield, Mo., $3,462; one locomotive short heating furnace, $3,908; convert 24 driving wheel drop pit jacks from pneumatic to hydraulic, $4,043; convert 10 trailer and trim drop pit jacks, $1,684.

FINANCIAL NOTES

Mesta Machine Co., Pittsburgh, has declared a Christmas dividend of 50c., payable Dec. 24 to stockholders of record Dec. 16 and a dividend of 75c., payable Jan. 1 to holders of record Dec. 16.

Budd Wheel Co., Philadelphia, has declared regular quarterly dividend of $1.75 a share, plus participating dividend of 25c. a share, on the preferred stock of the company. This dividend is payable Dec. 31 to stockholders of record Dec. 17. A dividend of 25c. a share was also declared on the common stock, payable Dec. 15 to stockholders of record Dec. 3.

Youngstown Sheet & Tube Co. has declared arrearage payment of $1,237,500 on accumulated preferred stock dividends, equaling $8.25 a share, to be made Dec. 15 to stockholders of record Dec. 5. Remaining arrearage, following this disbursement, will total $9.62½c. a share. In addition, a preferred dividend of $1.37½c. a share was declared payable Jan. 1 against stock of record Dec. 19.

Inland Steel Co., at a directors' meeting on Nov. 19, declared a special cash dividend of $1.50 a share on the capital stock, payable Dec. 17 against stock of record Dec. 1.

Republic Steel Corp. has declared a dividend of $12 a share on the 6 per cent cumulative convertible preferred stock, being payment in part of accumulations, and payable Dec. 19 to stockholders of record Dec. 9. The regular quarterly dividend of $1.50 a share on the 6 per cent cumulative convertible prior preference stock, Series A, for the quarter begun Oct. 1, has been declared payable Dec. 19 against stock of record Dec. 9.

General Electric Co. has declared a dividend of 25c. a share for the fourth quarter, the usual quarterly dividend, and an extra dividend of 50c. a share. The 157th dividend, a total of 75c. a share, will be paid Dec. 21 to stockholders of record Nov. 27.

Reclamation, Conditioning and Handling of Foundry Sands

(CONTINUED FROM PAGE 39)

very narrow range. One foundry reports a 250 to 270 permeability range with 600 lb. of new silica sand used per ton of castings produced. Another foundry reports a 200 to 215 permeability range with 450 lb. of new silica sand used per ton of castings produced, as compared with former practice with a 90 to 105 permeability and 1800 to 2100 lb. of new sand per ton of castings produced.

Similar reports are obtained from gray iron foundries using such reclamation, control and reconditioning equipment.

Continuous Molding and Handling

The previously discussed unit has become the central unit around which is built so-called continuous sand handling, mold handling and conveying units.

The plan view in Fig. 6 shows a continuous sand handling and mold handling unit. The elevation view shows the sand preparing unit for this continuous system. It will be noted that the means for controlling and conditioning the sand are virtually the same as those shown in Fig. 4. The sand is cleaned, screened and stored above measuring hoppers located over batch type mullers for conditioning the sand. Sufficient sand storage is provided so that the sand is used two to four times every eight hours of operation. Although batch type mullers are used, a continuous flow of sand is maintained in the system by means of the storage hopper above the mixers and the hopper directly beneath the mixers. The prepared sand is aerated as it is charged onto the distributing belt to the molders. By using the batch type machines and adding all new sand or bond, moisture, seacoal, etc., in each batch as it is prepared, each batch may be identical with each preceding batch and maximum uniformity and control obtained. The use of the muller prevents the formation of "clay balls" in the sand. These clay balls, if present, almost always cause surface defects on the castings.

The use of the batch type muller makes it possible in many systems to make all of the sand in the system the equivalent of so-called facing sand and thus eliminates the necessity of facing the molds. This helps to speed up the molding operation and decreases labor, handling and equipment ordinarily required for facing sand. Such a unit as has just been described has a production capacity of approximately 50 to 70 tons of properly prepared sand per hour.

Many such systems are operating today with moisture as low as 2.5 to 3 per cent and with bond strengths from 8 to 11 lb. per sq. in. (A.F.A. compression test). As a result, the castings peel readily, have a smooth finish, low cleaning cost and low losses due to sand defects. New sand or bond costs are very low and in many instances the amount of burned core sand getting into the system at the shakeout makes it unnecessary to add new sand to the system, the burned core sand being rebounded in the muller. Additions of bond, seacoal and moisture are made in the mixers. When all of the sand is mulled each time it is used, a mixing cycle of two minutes, including loading, mixing and discharge, usually is found to be sufficient.

One large automotive foundry operating such a sand preparing unit requires only two quarts of bentonite to each 2500 lb. of sand prepared.

The previous discussion has been of control, conditioning and reclamation units applicable in relatively large foundries only. Progress has been made in developing units for the smaller and intermediate size foundries also.

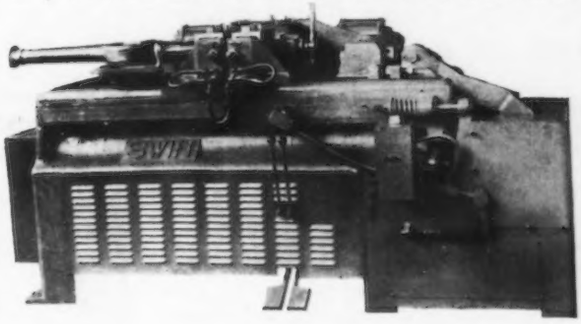
Figs. 7 and 8 show a small, simple, compact and relatively inexpensive unit that provides means to clean and screen the sand, load it into a batch type muller for proper conditioning and aerate it automatically as it discharges from the mixer into boxes for distribution after it has been properly prepared in the mixer.

With such a unit it is possible to control permeability by fines control, use a minimum of new sand or bond and moisture for workability, and to prepare a uniform sand in as nearly ideal moldable condition as is possible.

It will be seen from Fig. 7 that the unit consists of a screening and magnetic separator unit where

SWIFT *NO. 91-AA 500 KVA*
FLASH WELDER

Swift No. 91-AA 500 KVA Flash Welder welding forged flanges 3/16" wall thickness to axle housing 5/32" wall thickness. Actual time welding cycle 2 seconds. Takes up 3/16" variation in length of stock and welds to uniform length. Suitable for high speed production welding on parts up to 2½ square inch section.



SWIFT ELECTRIC WELDER CO., 6560 EPWORTH BLVD., DETROIT

Welding machines which are hand, hydraulic, cam or air operated, including the following types: SPOT, SEAM, PROJECTION, FLASH, FLUE, AND GUN WELDING UNITS . . . . . .

metallic and other refuse is removed. The cleaned sand is fed into the skip-hoist bucket loader. New sand also may be added into the bucket loader. The batch is elevated and charged into the muller where moisture, seacoal, etc., are added and mixed, usually for three to five minutes. The prepared sand is aerated automatically as it discharges from the muller. The entire unit is housed and exhausted, with damper control on the exhaust outlets to control the amount of fines in the sand.

Such equipment is in use in steel, gray iron, malleable and non-ferrous foundries. It offers the means of controlling the sand, reclaiming a considerable amount of sand formerly disposed of as refuse and thus makes available many savings in (1) new sand consumption, (2) cost of disposal of refuse sand, (3) bond consumption, (4) cleaning costs, (5) scrap losses due to sand defects, (6) improved surface and quality of castings, and (7) reduced labor costs (not always, but other savings more than offset any slight increase in labor).

One gray iron foundry pouring 25 tons of miscellaneous castings per day reports that new molding sand consumption was reduced 75 tons per month. Additional savings in cleaning costs, scrap losses and labor resulted in an overall saving of approximately $400 per month.

Many figures have been given as to savings accomplished through the proper application of equipment for controlling, reclaiming and conditioning foundry sands. These analyses and figures have been presented to show that every foundry large or small should investigate up-to-date methods for preparing and controlling their sands, compare these methods with their own procedure and determine whether or not time and money spent to control sand conditions will actually result in improved product and reduced costs. Invariably a program to improve sand conditions proves to be a self-liquidating investment and foundries today more than ever before must improve their quality and reduce their costs if they are to compete with other products.

In conclusion it should be pointed out that a successful sand control, conditioning and reclamation program may be had by the intelligent use of equipment to (1) properly clean and screen the sand to remove all metallic and other refuse, core butts, etc., (2) control the amount of fines in the sand, (3) properly prepare the sand in the batch type muller in order to use a minimum of bond and moisture for workability, and to obtain maximum uniformity of sand conditions, and (4) aerate the sand after it has been properly conditioned.

The equipment alone does not make the saving. It is the proper use of the equipment, as applied to the particular problems which justifies the capital expenditures for modern, up-to-date sand conditioning, reclamation and control machines.

PERFORATED METALS
INDUSTRIAL, ARCHITECTURAL, DECORATIVE
Industrial Screens for all purposes.
Cane and Machinery Guards.
Grilles to meet all requirements for heating, ventilating and air conditioning.
Registers and Cast Grilles.
DIAMOND has a national reputation for perforated metal products of the better quality.
DIAMOND MANUFACTURING CO.
Wyoming, Penna.
Sales Representatives in all principal cities.

Evolution of a Welding Rod

(CONTINUED FROM PAGE 42)

Pieces are fed automatically from a hopper into the machine, which grinds 250 pieces per min.

The pieces then go to the coating room. Here the coating is prepared in a mixer and is then placed in a loading cylinder from which it is transferred by hydraulic pressure to a screw-operated extruding cylinder which extrudes the coating material with a pressure of 25,000 lb. per sq. in.

The wires are fed automatically into the coating machine, passing through a die into which the coating material is forced, the die controlling the thickness of the coating. The extruding cylinder holds enough coating material to coat 185 to 200 lb. of wire.

The wires are loaded into a hopper at the side of the machine and are carried into the machine by a series of feed rolls at a speed of 125 to 250 pieces per min. depending on the size of the wire and the nature of the flux.

The pieces after coating drop automatically onto a catching device consisting of two beveled wheels about three inches in diameter. The ends of the wire contacting with the beveled faces of the wheels are deposited by the wheels as they slowly revolve onto a composition belt ten in. wide which carries the pieces about three inches apart into the adjoining enclosed and heavily insulated drying room. This conveyor is operated at variable speed up to 450 in. per min., depending on the drying time and the kind of flux used.

The electrodes are dried in a specially designed electrically heated oven approximately 65 ft. long. This oven has three heating zones each with thermostatic control, the center of the furnace being the high heat zone. The oven is divided longitudinally by insulating material into four chambers.

The wires are discharged from the belt conveyor that brings them from the coating room onto the oven conveyor, and on this they make four trips from one end of the oven to the other. That is, two complete circuits, starting at the top of the oven and making a return trip beneath the top conveyor belt through the next chamber and finishing the circuit near the bottom of the oven. There are eight changes in the speed of the oven conveyor so that the wires that are delivered to the oven from the coating room on a conveyor moving at 450 in. per min. leave the drying oven on a conveyor moving only ⅜ in. per min.

With the sharp reduction in the conveyor speeds, the electrodes which are three inches apart on entering the oven are backed up until they are piled six inches high when they emerge from the oven. With variable speed regulation of the conveyor, there is a range of from one to four hours in the drying time.

For controlling the temperature of the coating room a ten-ton refrigerating machine is located in the basement, making it possible to reduce the coating room temperature to 60 deg. F. on the hottest day. A proper amount of moisture is supplied to the air in the drying and coating room by an automatic spray-type humidifier.

After drying the electrodes go to an automatic machine for removal of the coating over a short space at the center. This leaves the wire bare where the electrode is gripped in the welding machine. Finally, the electrodes are packed for shipment.

The Maurath company is a pioneer in the manufacture of stainless and heat resisting electrodes and is said to be the only company that is engaged exclusively in making these electrodes. The special equipment in the plant was designed and built by George A. Maurath, president of the company.

Pickands, Mather & Co., Cleveland, are preparing to unwater their Bengal mine near Iron River, Mich. Electrical equipment has been installed to pump out the water which has accumulated since the mine was closed down in 1930. Approximately four months will be required to complete these dewatering operations, at which time practically all of the 125 men laid off in 1930 will be rehired.

The New Soviet Open-Hearth Departments

(CONTINUED ON PAGE 44)

tion of repair in certain time. In case of serious damage or loss, such as "heat breaking out," a very thorough investigation is held, and if evidence warrants it, action is brought against the responsible person, be he superintendent or shift foreman, and a "suit" is tried before a "workers" court. Penalty may mean loss of job and disgrace, or working a year at reduced pay. In the endeavor to get smoother work—better productivity of labor, and above all, to meet the plan—they organize and reorganize, and tear it all up and start over again with considerable frequency| And through it all, the old game of hiring and firing goes forward just as in America. The superintendent here has about the same power in that respect.

Two Divisions of Personnel

Broadly speaking, the personnel of a department is grouped into two divisions: 1—the engineering and technical workers, and, 2—workers. At Kuznetsk, where 13 furnaces are in operation, and the daily plan is about 4000 tons, we had 200 men and women in the first group, and about 1500 in the second. The "I.T.R.," as they are known, have the definite task, given to them by the "party" to "give the proper working conditions" to the second group. Then also, collectively, and individually, they are charged with another task to raise, first their own "cultural level," and concurrently, that of the workers. Cultural level is an all embracing expression. If an engineer acquires knowledge of another language, then he raises his level. If a slagger learns how to pour a test, he grows in culture. To be "not grammatical" which means anything from all thumbs to downright illiteracy is a mark of shame. Hence, raising the cultural level is secondary only to meeting the plan. Some poor superintendent and his party secretary might be feeling smugly elated over having met last month's plan only to have a representative from the main plant party committee sail in upon them and demand that they get busy and

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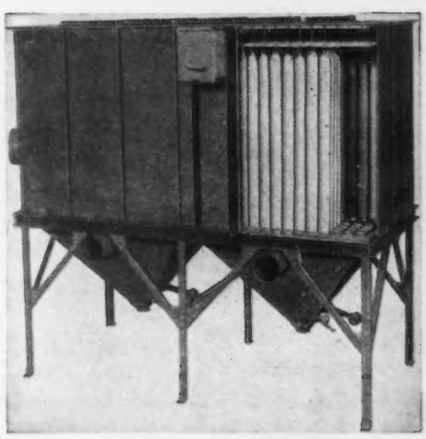
Eliminate the dust nuisance and hazard

Ruemelin Tubular type dust collectors have demonstrated their high operating efficiency in many plants. Designed to give economical service. Consider their important features before buying any filter:

- **Sustained efficiency.**
- **Lowest maintenance expense.**
- **Convenient accessibility for cloth tube inspection.**
- **All working parts on clean air side.**

Whether you buy or not, investigate the reasons for Ruemelin supremacy in Dust Filter construction.



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remedy the lax conditions in the department with regard to examinations of I.T.R. and workers, to fulfill the order about organizing study groups, or providing study rooms, books, charts, etc. The instructors, lecturers, and leaders of these study courses are I.T.R. men. It is part of their social duty. Often their load is heavy in this respect. Many of them average many hours per week over and above the actual time consumed by shift work.

Much money, time and effort are spent on this self improvement. To me it was a very novel, interesting experience to be in the "presidium" at a mid-winter examination of I.T.R. members. Each evening after working hours until they were all put through the mill, everybody comes. It's a Roman holiday. The victim has to stand at a blackboard and answer questions (by anybody) of both practical and theoretical nature. He must prove that he reads current technical literature, both foreign and domestic, must show that he is thoroughly familiar with design and operation of the shop, and that he has an active, resourceful mind on the question of getting away from the old hand methods and substituting newer mechanized ways. To fail is serious. He loses "face" and must undertake definite study for the coming year. I have often wondered where those fellows could find a spare hour. For, all hours of the day, and until late at night, in study halls in various parts of the city, or in the big rooms of the "trade union" headquarters of each department, these study courses are in session. Studies in technic related to their work, politics, economics, and also the three R's.

To meet the plan, to work and live in a disciplined way, and to attain a higher cultural level—these are the objective trinity toward which Soviet Russia struggles at this time. All imaginable means are employed to stimulate the competitive urge. The local steel town newspaper, the great national daily's, the wall boards, movies and theaters, are all utilized to spur on the indifferent. To create a genuine, but healthy competitive urge. Lenin has said that the "newspaper is not only a collective propagandist, and a collective agitator, but also a collective organizer." Therefore, the steel plant has no secrets from the news gatherer. He is in the shop every day. What happens there is first line news. If one worker wants to scold another, he uses the newspaper. If the community is dissatisfied with the shop superintendent, or the manager of the stockyard, it expresses this in no uncertain terms in the local paper. If some engineer, in the course of his duty, has uncovered some, to him, new and interesting fact, he writes an article immediately to a national technical journal. And who does not know of the wall boards that decorate every prominently conspicuous place on shop or office walls? The ingenuity, cruelty, and resourcefulness of these home-made lithograph creators is amazing. At our shop in Mariupol where we have three, 300-ton tilting furnaces in operation endeavoring to give eight tons per square meter of hearth area, we have one large board that particularly enravishes me. There are 12 pictures on its border. One for each first helper. He who came nearest to meeting the plan last week has his name placed abreast a picture of an aviator, in the latest of Soviet planes floating arrogantly in some stratosphere. He who was next best zooms at breakneck speed around a dizzy curve on a Soviet motorcycle. The next one tours elegantly across country in a Soviet Ford, and so on down to the stupid peasant dragging his pig to the bazaar, and the lazy loafer asleep on a snail. Individuals who overindulge in vodka, who neglect study course, who do sloppy work are mercilessly caricatured and completely described on other boards; and just as freely and bitterly denounced in open meetings. More and more as time goes by, the superintendents and higher officers are being exempted from this. But they are not immune by any means. For example, our superintendent months ago promised the furnace crews that he would get from the Urals, an unused Dolomite machine. He is now in lithograph, posed as riding leisurely through the gentle pine-clad Urals, on a fantastic Dolomite machine drawn by a yoke of oxen.

Applying Mass Psychology

Over and above all the local efforts to attain these objectives, we have here in the Soviet land an employment of "mass psychology" that has never before been equalled.

This gives the tone to life—the speed and direction to work in the Union. It creates for us our standards, our heroes, our news. Up to 1933 it created the Udarniks and Shock workers. These were the "men of the hour," the "news-

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worthy" people. Then came the day of "Otlechnik," meaning a peculiar form of excellence named after a worker who had become a sort of super-Udarnik. However, all of the elements of mass appeal were not present in this "Otlechnik" movement. Japan though, by her threatening excursions in Manchuria, gave occasion to pull out the "war stop." It was pulled wide open, and while its high shrill notes were still screaming "preparedness" into every nook and corner in the land, a Don Bas miner, Alexei Stakhanov, down in the dark shaft of the Irmino Coal Mine, in one shift mined 240 tons of coal when his "plan" called for only 40 tons. That was one September day in 1935. Almost simultaneously a ball bearing maker and a hammer man in a forge shop burst through this old level of productivity into almost unbelievable high ground. Stalin called these workers to the Kremlin. Held them up before the nation as "special people." Said that the work of these men gave evidence that the I.T.R. all over the land, by stubborn adherence to "old norms" were holding back the advance of the workers to the "higher cultural level." This was the birth of the "Stakhanovite Movement." Like a wild prairie fire it has swept over this land, capturing the imagination of even the most prosaic. All of the proper ingredients of mass appeal are here. For one thing it greatly appeals to the instinct of national pride. Constantly we hear of how this man breaks a world record, of how this furnace surpasses in heat any furnace in the world. Of how the old norms of production on a certain unit as given to us by the engineers of foreign countries are far too conservative. For example, Weirton, in 1929 or '28 made 4.9 tons of steel per square meter of hearth area. This figure was used as the basis on which the new, standard 150-ton Russian furnaces were designed. The Americans said "4.2 tons are possible here." The Russians at that time, said, "we must make 4.7 tons." The Americans said, "If you do, you will be sitting on top of world." But a first helper in Stalinsk made a 180-ton heat in 6 hr. A furnace in Makewka made 126,000 tons for the year. A tilting furnace here made a 300-ton, high ore heat here in 11 hr. on mixed gas. And through it all the papers shout and scream "Stakhanovite." But the engineers, designers, superintendents and directors are, as Mr. Louis Horowitz said, "Like the man's hold of the tiger's tail chasing him round a tree," and what they are doing in the way of redesigning, revamping, and rebuilding these new furnaces and new shops so as to meet the demands created by this Stakhanovite movement is something like the dreams of a rarebit fiend. Something which I hope to describe later in an article more technical than this story is how the open-hearth man of Russia "meets his plan," "raises his cultural level" and "works in a disciplined way."

A. S. T. E. Adds Three New Chapters

DURING the past few weeks, the American Society of Tool Engineers, with headquarters in Detroit, has added three new chapters. The organization has made remarkable progress since the machine tool show a year ago last September, at which time the society first attained national prominence by an exhibit which attracted a great deal of attention. Until recently the society has had chapters in Cleveland, Racine and Milwaukee. On Nov. 9 a chapter was installed at Chicago, on the 12th one at Bridgeport and on the 13th a third at Hartford, Conn. Several other chapters are in the process of formation and the announcement of their formal installation is expected shortly.

Franklin W. Creager, Chicago Screw Co., is chairman of the Chicago chapter. Marshall L. Blu, of Sears, Roebuck & Co., is vice-chairman; Willard T. Wilson, also of the Chicago Screw Co., 1026 South Homan Avenue, is secretary; Edward S. Backner of the Chicago Molded Products Co., is treasurer.

The following officers have been named for the Bridgeport chapter: Floyd B. Petteys, Consolidated Ashcroft-Hancock Co., chairman; C. A. Dundore, secretary; George W. Wellington, Singer Mfg. Co., treasurer; John Bullard of the Bullard Co., chairman of the entertainment committee.

Officers of the Hartford chapter are A. H. d'Arcambal, Pratt & Whitney Co., chairman; F. L. Woodcock, Pratt & Whitney Aircraft Co., secretary; Henry I. Moore, Firth-Sterling Steel Co., treasurer.

The installations in Connecticut were made by Ford R. Lamb, president of the society of Detroit. The Chicago group was installed by Edward Johnson, of the Packard Motor Car Co. and chairman of the nominating committee.

NOPAK VALVES

An air leak equal to 1/16" diameter hole costs $28.00 per month. Air is expensive, control it efficiently and accurately with a NOPAK valve —a patented leak-proof valve guaranteed to stay tight without maintenance. Its flat, patented disc together with a packless spindle prevents sticking and assures you of many years of leak-proof operation. Permits throttling or quick opening. Easy to operate. Seat protected at all times and cannot wear out. NOPAK valves are suitable for air, gas, water, or oil. *Write for Bulletins.*

Made in shut-off, three-way and four-way styles 1/4" to 2" pipe openings, three and four-way for operating single and double acting cylinders.

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ALSO COMPLETE LINE OF BALERS: *Electric and Hydraulic, also HYDRAULIC PRESSES and PUMPS*

PLANT EXPANSION AND EQUIPMENT BUYING

. . . Du Pont Rayon Co., New York, has plans for additions to mill at Ampthill, Va., to cost over $400,000 with equipment.

o o o

. . . Monsanto Chemical Co., St. Louis, has let contract for new plant at Monsanto, Tenn., to cost with equipment $1,000,000.

o o o

. . . Steel Stamping Co., Lorain, Ohio, will expend $125,000 for plant additions and equipment.

NORTH ATLANTIC

Habirshaw Cable & Wire Corp., Yonkers, N. Y., is negotiating for purchase of adjoining city-owned property for several one-story units. Cost over $800,000 with equipment. Company is a subsidiary of Phelps-Dodge Corp., New York.

American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, manufacturer of industrial chemicals, has asked bids on general contract for one-story addition to branch plant at Valdosta, Ga. Cost close to $70,000 with equipment.

F. & M. Schaefer Brewing Co., Kent Avenue, South Ninth and Tenth Streets, Brooklyn, has plans for two eight-story additions, 90 x 155 ft., to double present capacity. Cost over $1,500,000 with equipment.

Williamsburgh Power Plant Corp., 385 Flatbush Avenue Extension, Brooklyn, has let contract to Stone & Webster Engineering Corp., Boston, and 90 Broad Street, New York, for expansion and improvements in electric generating station, including two 18,750-kw. turbo-generator units and accessories, two high-pressure boiler units, automatic stokers for firing pulverized coal, fuel pulverizers, pumping machinery and accessory equipment. Cost over $4,000,000 with equipment.

Superintendent of Lighthouses, St. George, Staten Island, N. Y., asks bids until Dec. 10 for 240 electric motor-driven flasher mechanisms to control flash and eclipse characteristics of lights on beacons or buoys; until Dec. 7, for construction, equipment, completion and delivery of one twin screw, steel, steam-propelled lighthouse tender.

Viscose Co., 200 Madison Avenue, New York, manufacturer of viscose rayon products, is concluding purchase of about 300-acre tract at Front Royal, Va., for new mill of several one and multi-story units, with power house and other structures. Cost over $500,000 with machinery.

Major Equipment Co., 419 West Fifty-fourth Street, New York, manufacturer of store fixtures, has leased building at 42-31 Ninth Street, Long Island City, for new plant.

Witco Carbon Co., New York, has been organized by Robert I. Wishnick, 295 Madison Avenue, head of Wishnick-Tumpeer, Inc., same address, manufacturer of chemicals, colors, etc., and associates, to build new carbon black manufacturing plant near Dumas, Moore County, Tex., recently referred to in these columns as a project of Continental Oil Co., New York, which will be interested in enterprise. Plant will include compressor station, power house and storage and distributing buildings. Cost close to $1,000,000 including machinery.

Albany Malleable Iron Co., Voorheesville, N. Y., has been acquired by new interests, which will modernize plant for manufacture of castings for airplanes and other service. Cost over $75,000 with equipment. New company will be formed to carry out project.

Du Pont Rayon Co., Inc., 350 Fifth Avenue, New York, has plans for additions to mill at Ampthill, Va. Cost over $400,000 with equipment. Company has work under way on addition to cellulose film division at same works, to cost over $300,000, with machinery.

Department of Public Works, City Hall, Utica, N. Y., has revised plans for one-story municipal service, repair and garage building for city-owned automobiles and motor trucks. Cost about $125,000 with equipment. J. B. Shaw, City Hall, is city engineer in charge.

Lighting Studios, Inc., 88 Washington Street, Newark, N. J., August Eckel, president, manufacturer of electric lighting fixtures and equipment, has leased two-story factory at 6 Atlantic Street for new plant.

Joseph H. Reinfeld, Inc., 60 Branford Place, Newark, liquor distiller, will soon begin superstructure for new three-story plant, 100 x 300 ft., at Frelinghuysen Avenue and Noble Street, for rectifying, storage and distribution, for which general contract recently was let to Fatzler Co., 11 Hill Street. Cost close to $75,000 with equipment. Frank Grad & Son, 48 Commerce Street, are architects.

Borden's Farm Products Division, 110 Hudson Street, New York, has asked bids on general contract for new one-story milk-pasteurizing, storage and distributing plant at Newark. Cost over $50,000 with machinery. E. J. Lockwood is company architect, address noted.

Manganese Steel Forge Co., Richmond Street and Castor Avenue, Philadelphia, manufacturer of manganese steel wire cloth, forgings, etc., has leased two-story building at 2810-22 East Victoria Street for expansion.

Troy Iron & Brass Co., recently formed, has acquired Sweet & Doyle plant at Green Island, N. Y., and will start production shortly of gray iron, brass and aluminum castings. Joseph Jackson, 9 Munro Court, Troy, N. Y., and William Shaw, Watervliet, N. Y., are incorporators.

BUFFALO DISTRICT

Chautauqua Trailer Coach Co., East First Street, Jamestown, N. Y., manufacturer of motor house trailers, plans new one-story plant with divisions for parts production and assembling. Cost close to $50,000 with equipment. A. T. Ackroyd is company engineer.

Boards of Education, North Tonawanda and Tonawanda, N. Y., plan new joint multi-story vocational school to serve both municipalities. Cost close to $250,000 with equipment. Financing will be arranged through Federal aid.

Morrison Machine Products Co., 1418 College Avenue, Elmira, N. Y., manufacturer of tools for automatic screw machines, collets, etc., has let general contract to Henry W. Streeter Corp., 351 College Avenue, for one-story addition, 50 x 220 ft. Cost about $65,000 with equipment. Haskell & Considine, Hulett Building, are architects.

NEW ENGLAND

Hamilton Standard Propeller Corp., South Main Street, East Hartford, Conn., manufacturer of aircraft propellers and kindred airplane equipment, has let general contract to R. G. Bent Co., 93 Edwards Street, Hartford, for one-story addition. Cost close to $45,000 with equipment. Company is a subsidiary of United Aircraft Corp., same place.

School Committee, Athol, Mass., plans manual training department in new two and three-story junior and senior high school, for which bids will be asked on general contract about Dec. 21. Cost $475,000. Financing is being secured through Federal aid. Harold E. Mason, 15 Prospect Street, Leominster, Mass., is architect.

White Fuel Corp., 900 East First Street, Boston, plans rebuilding coal elevator on South Boston waterfront, recently destroyed by fire. Loss close to $50,000 with machinery.

American Abrasive Co., Katherine Street, Westfield, Mass., manufacturer of grinding wheels and other abrasive materials, has let general contract to Truscon Steel Co., 38 Chauncy Street, Boston, for one-story addition, 85 x 115 ft. Part of unit will be used for storage and distribution. Cost about $45,000 with equipment.

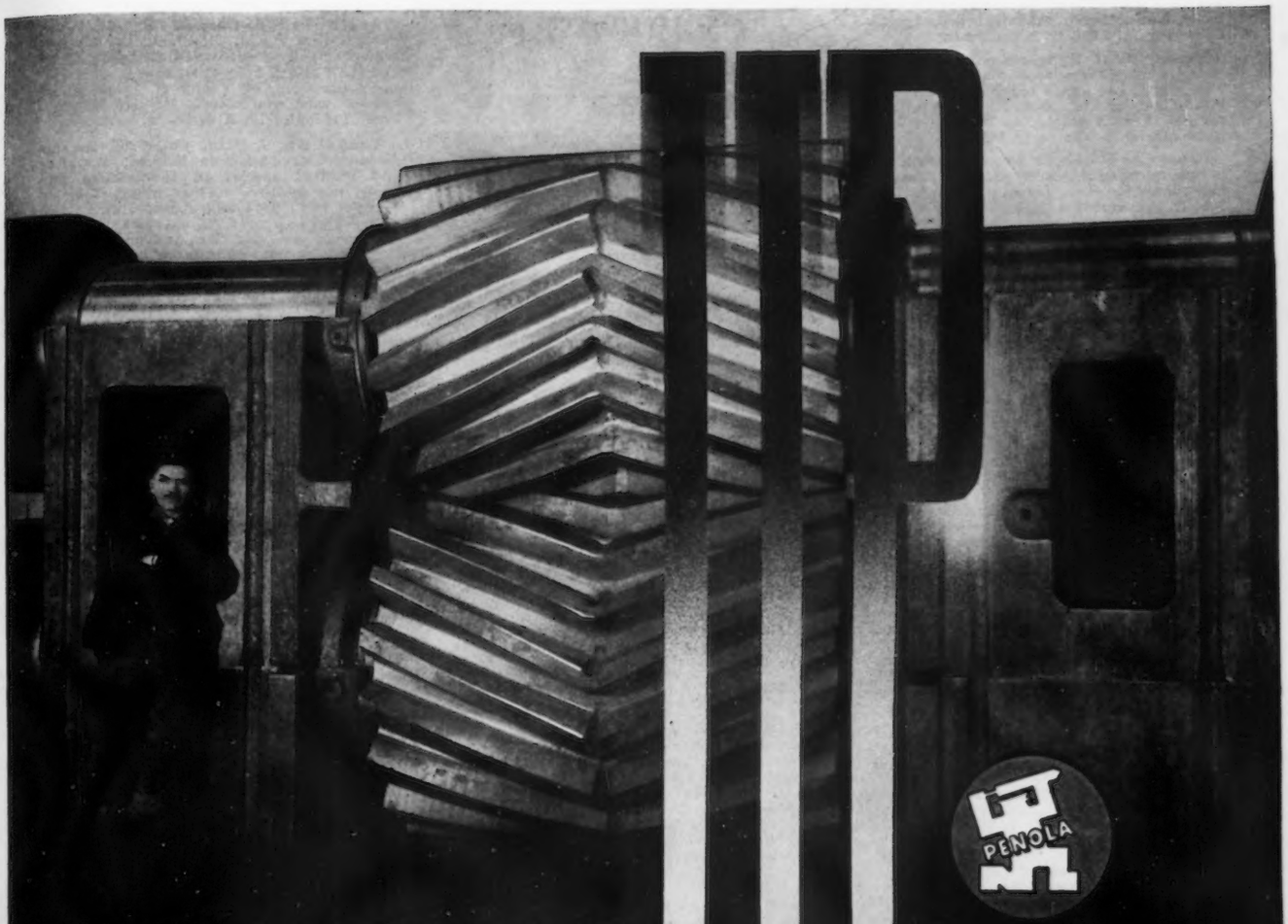
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., has taken out permit for one-story and basement addition, 84 x 90 ft. Cost about $30,000 with equipment. Fred A. Webster, Waterbury, is architect.

SOUTH CENTRAL

Monsanto Chemical Co., 1700 South Second Street, St. Louis, has let structural steel contracts to Ingalls Iron Works Co., Birmingham, and Virginia Bridge Co., Roanoke, Va., for initial units for new plant at Monsanto, near Columbia, Tenn., where large tract has been acquired. Company will establish a townsite at new location. Plant will include power station, machine shop and other mechanical departments. Cost close to $1,000,000 with equipment.

Purchasing and Contracting Officer, District E, CCC Camp Beauregard, Alexandria, La., asks bids until Dec. 14 for parts for air compressors and engines (Proposal 5402-17).

Swift & Co., Union Stock Yards, Chicago, have taken over about 500 acres on Old Spanish Trail, near Lake Charles, La., for new meat-packing plant, with power



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Use of Penola Compound helps reduce wear, noise and power loss. Specify it wherever gear units operate under heavy loads, peaks or shocks. Let the leader in steel mill lubrication protect your gear investment—and keep your tonnage rolling!

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Grease Works Operated at

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Eldorado, Kans. Pittsburgh, Pa.

(Photo—United Engineering & F'dry Co.)

LUBRICATION FOR THE STEEL INDUSTRY • 1885 TO 1936

house and other mechanical departments. Cost over $100,000 with equipment.

Beverly Coat Hanger Co., 500 Indiana Street, San Francisco, manufacturer of wire goods, has leased building on Old Shell Road, Mobile, Ala., and will equip at once for new branch plant. A. L. Ryan is company official in charge at Mobile.

Bama Co., 616 North Seventh Street, Birmingham, manufacturer of food products, has plans for new one-story plant, 50 x 225 ft., at Houston, Tex., where site has been acquired. Cost over $50,000 with equipment.

WASHINGTON DIST.

De-Vo Motor Car Corp., Hagerstown, Md., recently chartered under State laws by Norman De Vaux, formerly head of Chevrolet Motor Co. of California, Inc., and associates, has acquired local property and will establish plant for manufacture of new four-cylinder automobile, largely for export. Initial operations will be given over primarily to assembling, with parts secured from outside sources. Plant will cost over $100,000 with equipment. F. F. Beall, formerly vice-president, Packard Motor Car Co., Detroit, and George R. Scott, previously connected with Chevrolet Motor Co. of California, Inc., as production manager, will be officials of new company, of which Mr. De Vaux will be president.

Crown Cork & Seal Co., Inc., Eastern Avenue and Kresson Street, Baltimore, will soon begin superstructure for one-story addition, 120 x 160 ft., primarily for storage and distribution, for which general contract recently was let to Consolidated Engineering Co., 20 East Franklin Street. Cost over $55,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 8 for welding electrodes (Schedule 9329), steel wire nails (Schedule 9325), files (Schedule 9328) for Eastern and Western Navy yards; rough machined steel forgings (Schedule 9361) for Eastern yard and Puget Sound yard; 56 pneumatic drills for Mare Island yard, 86 pneumatic grinders for Mare Island and Philadelphia yards, 194 pneumatic hammers for Boston, Mare Island, Brooklyn, Sewall's Point, San Diego and Puget Sound yards (Schedule 9333); until Dec. 11, spare parts for airplanes (Schedule 900-233) for Sewall's Point yard.

Bull Run Power Co., Manassas, Va., plans transmission and distributing lines for rural electrification, including service facilities. Company will also make extensions in electric power plant, to include additional equipment. Fund of $86,000 has been secured through Federal aid.

SOUTHWEST

All-Steel Products Co., 801 South Wichita Street, Wichita, Kan., will begin superstructure at once on one-story welding works, 40 x 60 ft.

Phillips Petroleum Co., Bartlesville, Okla., plans new carbon black manufacturing plant near Dumas, Tex., where property is being secured. It will include compressor plants, power station and other structures. Cost close to $750,000 with equipment.

S. G. Adams Metalware Co., 2940 Franklin Street, St. Louis, manufacturer of sheet and pressed metal products, plans one-story factory addition. Cost close to $40,000 with equipment.

Union Wire Rope Corp., 2030 Manchester Avenue, Kansas City, Mo., has filed plans for one-story addition, 60 x 380 ft., for storage and distribution.

Magnolia Petroleum Co., Magnolia Building, Dallas, Tex., has plans for new works for production of natural gasoline near Dumas, Tex., with steel tank storage and distributing division, power house, compressor plant, pumping station and other mechanical departments. Cost about $175,000 with equipment.

Crown Cork & Seal Co., Eastern Avenue and Kresson Street, Baltimore, has leased part of building at 1207 Mary Street, Houston, Tex., for branch plant for metal container division, with main works at Philadelphia, specializing in production of metal cans for beer, wines, etc.

OHIO AND INDIANA

Steel Stamping Co., Broadway, Lorain, Ohio, manufacturer of steel products for domestic use, steel toys and other steel stampings, has let general contract to T. J. Hume, 435 Hamilton Street, for four one-story additions, 100 x 125 ft., 80 x 100 ft., 50 x 75 ft., and 50 x 60 ft.; also for addition to steam power house, where new boiler units and auxiliary equipment will be installed. Entire project will cost close to $125,000 with equipment. F. J. McFadden, West Erie Avenue, is architect.

Black Boring Machine Co., 6701 Pear Avenue, S.W., Cleveland, manufacturer of patented boring machines and parts, has acquired plant and business of McIntosh & Merrell Machine Co., East Forty-ninth Street and Luther Avenue, N.E., and will consolidate, continuing machine business of acquired company. Black company will remove to last noted location, where expansion will be carried out.

Results Are What Count

If you want real economy—look to results rather than to first cost. It is on this basis that "HERCULES" (Red-Strand) Wire Rope continues to make and hold friends. There are reasons, of course, why this wire rope is so dependable and long lasting, and we are always glad to give full details to everyone interested in saving money. Made in a wide range of constructions including Round Strand, Flattened Strand, Preformed, Non-Rotating and Steel Clad types.

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NEW YORK—CHICAGO—DENVER—SAN FRANCISCO

Angell Nail & Chaplet Co., 4580 East Seventy-first Street, Cleveland, has let general contract to Gillmore-Carmichael-Olson Co., 1873 East Fifty-fifth Street, for one-story addition, 90 x 100 ft. Cost about $50,000 with equipment. Edward A. Weiland, 14236 Euclid Avenue, is engineer.

Titan Valve & Mfg. Co., 3205 Perkins Avenue, Cleveland, manufacturer of valves and kindred specialties, thermostats and parts, has acquired former plant of Noble Refining Co., 9913 Elk Avenue, N.E., two stories and basement, 88 x 100 ft., and will remove to new location and install additional equipment. Adjoining land also has been purchased for later additions.

Bruckmann Brewing Co., Ludlow Street and Central Parkway, Cincinnati, has asked bids on general contract for extensions and improvements in brewery building No. 4, including additional equipment. Cost over $45,000. Stewart & Stewart, Blymyer Building, are architects.

Reilly Tar & Chemical Corp., Merchants Bank Building, Indianapolis, has plans for new branch works on Independence Road, Cleveland, acquired several months ago, consisting of main one-story unit, 30 x 225 ft., two two-story buildings, 40 x 50 ft., and several smaller structures. Superstructure will begin early in 1937. Cost close to $100,000 with equipment. H. R. Warner is company engineer.

Warner Gear Co., 1106 East Sycamore Street, Muncie, Ind., manufacturer of automobile gears, brakes, etc., has let general contract to Albert J. Glaser, 401 South Lincoln Street, for one-story and basement addition to plant No. 3. Cost over $50,000 with equipment. Company is a subsidiary of Borg-Warner Corp., Chicago.

SOUTH ATLANTIC

Scripto Mfg. Co., 425 Houston Street, N.E., Atlanta, Ga., manufacturer of automatic lead pencils and kindred mechanical specialties, has let general contract to Benning Construction Co., Chamber of Commerce Building, for one-story addition, primarily for storage and distribution. Cost close to $40,000 with equipment.

Commanding Officer, Ordnance Department, Augusta Arsenal, Augusta, Ga., asks bids until Dec. 14 for four motor-driven drilling machines, one combination saw and dado machine, one motor-driven woodworking lathe, one motor-driven sharpener, one automatic circular cross-cut and rip saw, one dust hood, one 3000-lb. pressure gage tester (Circular 6).

Coca-Cola Bottling Co., Hickory, N. C., has asked bids on general contract for two-story and basement mechanical-bottling plant. Cost over $50,000 with equipment. Henry I. Gaines, Public Service Building, Asheville, N. C., is architect.

WESTERN PA. DIST.

Universal-Cyclops Steel Corp., Bridgeville, Pa., has arranged for new stock issue of 39,353 shares, a considerable part of proceeds to be used for extensions and improvements in plant, including equipment. Company was formed recently through merger of Universal Steel Co., Bridgeville, and Cyclops Steel Co., Titusville, Pa.

Guarantee Specialty Mfg. Co., East Ninety-sixth Street and New York Central Railroad, Cleveland, manufacturer of metal stampings, hardware, etc., has selected property at Colliers, W. Va., for new one-story plant, totaling about 100,000 sq. ft. floor space. Cost close to $140,000 with equipment.

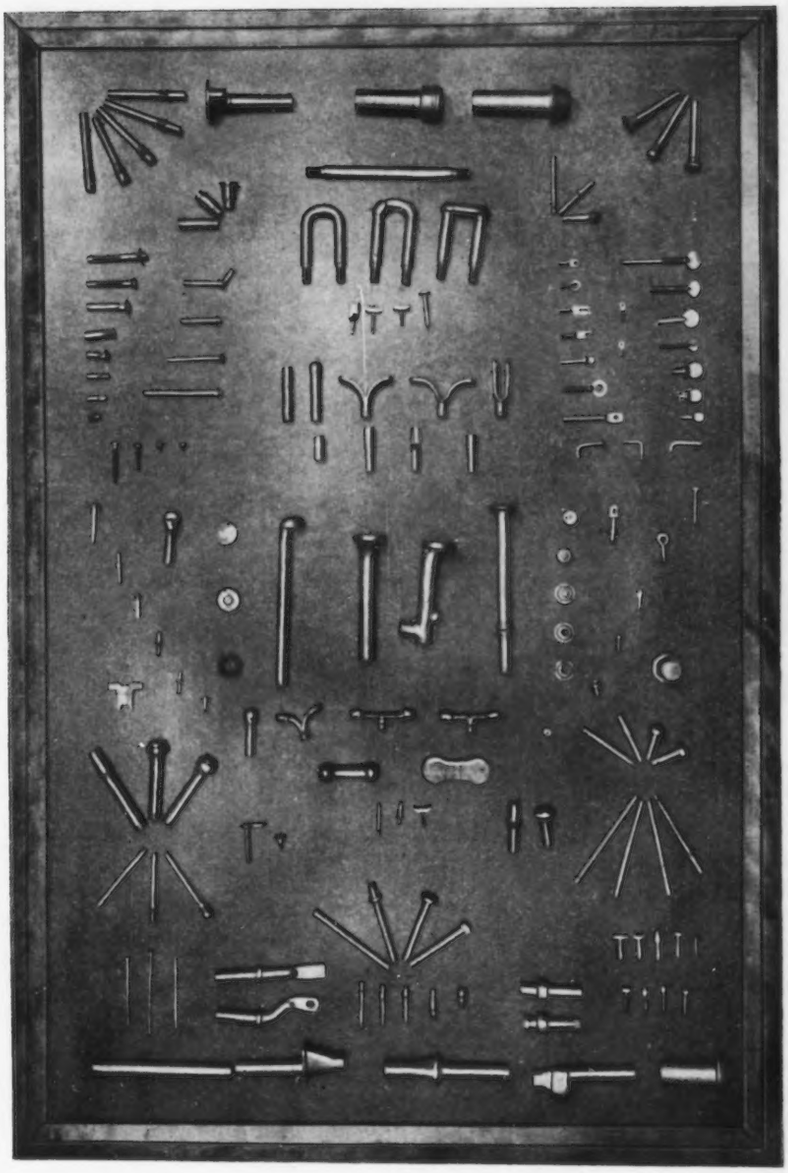
Du Bois Electric Storage Battery Co., Du Bois, Pa., plans early rebuilding of part of plant recently destroyed by fire. Loss about $75,000 including equipment.

MICHIGAN DISTRICT

Saniwax Paper Co., North Park Street, Kalamazoo, Mich., manufacturer of waxed and other processed papers, has let general contract to H. L. Van der Horst, Kalamazoo, for one-story addition. Cost close to $40,000 with equipment. LeRoy & Newlander, Kalamazoo, are architects.

Auto Plane Corp., Mechanics Building, Island Park, Mount Pleasant, Mich., manu-

are any of **YOUR** products here?



IF any of your small products look like these, it's high time to investigate. We may be able to cut their cost in half. Time and again, Manville Headers have dropped the bottom out of prices for small parts formerly hot-forged from bar or rod stock. For instance, a large manufacturer of automobiles was hot-forging a variety of intricate parts at 2½c each. Manville Headers cut their cost to ⅞c each! It's amazing what modern cold forging can do. Not every product can be cold forged . . . but when it can, savings are made. Without obligation, put your problems up to Manville engineers.

MANVILLE HEADERS

E. J. MANVILLE MACHINE CO., WATERBURY, CONN.

Cleveland Office: 1209 Sweatland Building

facturer of airplanes and parts, plans new one-story plant, with divisions for parts production and assembling. Cost about $45,000 with equipment.

General Motors Parts Corp., General Motors Building, Detroit, a unit of General Motors Corp., has asked bids for one-story addition to branch storage and distributing plant at Cleveland, 55 x 220 ft., including improvements in present building. Cost close to $100,000 with equipment.

Motor Wheel Corp., East Saginaw Street, Lansing, Mich., manufacturer of steel automobile wheels, heavy steel stampings, etc., has let general contract to George Hagemeir & Son, Lansing, for one-story foundry, 100 x 300 ft. Cost about $850,000 with equipment. New unit will be occupied under lease by Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., exclusively for production for first noted company, including centrifuse brake drums and kindred castings. Equipment will be installed by last noted company.

Coca-Cola Bottling Co., Flint, Mich., has let general contract to Perry-Root Co., Flint, for one-story mechanical-bottling works. Cost close to $80,000 with equipment. John MacKenzie, Flint, is architect.

MIDDLE WEST

Chicago Pump Co., 2336 West Wolfram Street, Chicago, manufacturer of pumping machinery and parts, has asked bids on general contract for two-story addition, 90 x 125 ft. Cost about $50,000 with equipment. Alfred S. Alschuler, 28 East Jackson Boulevard, is architect.

Sherwin-Williams Co., Cottage Grove Avenue and East 115th Street, Chicago, manufacturer of paints, oils, varnishes, etc., has let general contract to Lionel H. Uhlmann, 130 North Wells Street, for four-story addition, 100 x 200 ft. Cost over $125,000 with equipment. Main offices of company are at Cleveland.

Abbott Laboratories, Inc., Fourteenth Street, North Chicago, Ill., manufacturer of chemicals, has plans for two-story addition. Cost over $60,000 with equipment.

Board of Supervisors, Grand Forks County, Grand Forks, N. D., asks bids until Dec. 10 for automatic underfeed stoker, including forced-draft equipment, for installation in power house at local county hospital.

Clay-Union Electric Corp., Vermillion, S. D., R. R. Fowler, head, will take bids soon for about 74 miles of transmission and distributing lines for rural electrification in parts of Clay and Union counties, with service facilities. Fund of $77,000 has been secured through Federal aid. Buell & Winter Engineering Co., Insurance Exchange Building, Sioux City, Iowa, is consulting engineer.

J. I. Case Co., Racine, Wis., manufacturer of agricultural implements and parts, has taken up an option to purchase the plant of Velie Motors Corp., Moline, Ill., consisting of large tract improved with five main buildings, totaling 600,000 sq. ft. floor space. Further details are not yet available.

Chicago Aluminum Castings Co., 2647 Ogden Street, Chicago, has let general contract to A. T. Herlin & Son, 6616 Clyde Avenue, for one-story foundry, 56 x 148 ft. Cost close to $35,000 with equipment. Alfred S. Alschuler, 28 East Jackson Boulevard, is architect.

PACIFIC COAST

Lathan Co., Inc., 1466 Pine Street, San Francisco, manufacturer of automobile brakes and kindred automotive equipment, has let general contract to D. L. Blenfield, 666 Mission Street, for one and two-story plant, 100 x 160 ft., at South San Francisco. Cost about $65,000 with equipment. Albert Roller, Crocker First National Bank Building, San Francisco, is architect.

Murphy Ranch Co., Whittier Boulevard, Whittier, Cal., has let general contract to Harman & Co., 3044 Riverside Drive, Los Angeles, for three-story lemon-packing, storage and distributing plant. Installation will include conveying and other mechanical-handling equipment, air-conditioning system and other equipment. Cost about $70,000 with machinery. W. W. Ache, 301 North Citrus Avenue, Los Angeles, is architect.

American Distillery, Inc., Sausalito, Cal., will take bids soon on general contract for alterations and improvements in plant and for group of one-story additions for whiskey distilling, aging, storage and distribution. Cost over $100,000 with equipment. W. E. Murray, 908 Hayes Street, San Francisco, is engineer.

General Petroleum Corp., 310 Sansome Street, San Francisco, has acquired about 40 acres on Columbia River, near Attalia, Ore., for new bulk oil storage and distributing plant, with steel tank division for storage and distribution, pumping station and other units. Cost over $75,000 with equipment.

Rare Metals, Inc., Moab, Utah, plans new one-story concentrating plant for treating local ores. Cost close to $50,000 with machinery. G. E. Pitts is company engineer.

City Council, Seward, Alaska, has rejected bids recently received for municipal hydroelectric generating plant, including transmission line to town limits and distributing system, and will ask new bids about March, 1937. Fund of $140,000 has been secured through Federal aid. Hubbell & Waller, Alaska Building, Seattle, are consulting engineers.

Worley & Co., 260 North Durfee Avenue, Pico, Cal., near Los Angeles, manufacturers of steel lockers, steel shelving, etc., have asked bids on general contract for one-story addition, 60 x 150 ft. Gable & Wyant, 3723 Wilshire Boulevard, Los Angeles, are architects.

FOREIGN

Manesty Machines, Ltd., Liverpool, England, manufacturer of automatic precision machinery and parts, water stills and kindred equipment, has acquired about seven-acre tract for new plant. Initial unit will be one-story, about 30,000 sq. ft. floor space. Cost over $125,000 with equipment. Other units will be built later. Company is affiliated with Thompson & Capper, Wholesale, Ltd., Liverpool, manufacturer of chemical products.

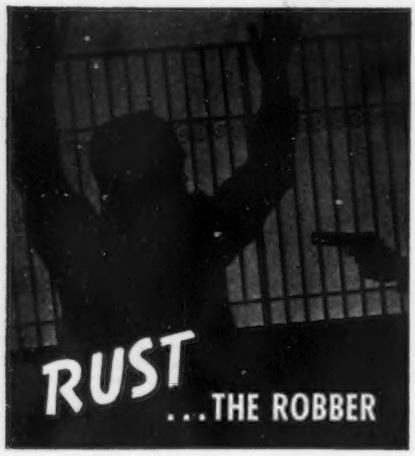
Asahi Glass Co., Ltd., Tokyo, Japan, manufacturer of glass, industrial chemicals, refractories, etc., operating five plants, plans several additions to different works, with installation of new equipment. Company is securing a substantial interest in Manchuria Soda Co., Ltd., and Manchuria Salt Industry Co., Ltd., Mukden, Manchuria, and will participate in expansion to be carried out by these plants, specializing in production of soda ash, caustic soda and industrial chemicals. First noted company has arranged for increase in capital from 20,0000,000 to 40,000,000 yen (about $11,600,000), considerable part of fund ($5,800,000), to be used for expansion noted.

Fairfrieve & Son, Ltd., 50 Dovercourt Road, Toronto, Ont., manufacturer of washing machines and parts, has acquired adjoining property, including existing building, which will be remodeled for expansion. One-story addition will be built for machine shop, storage and distribution. Entire project will cost over $50,000.

New Die Casting Booklets Available

A SUPPLEMENT to the visual report of progress published a year ago is now being offered by the New Jersey Zinc Co., 160 Front Street, New York. This new booklet contains numerous reproductions of recent designs in zinc die castings which push back the limitations noted last year and demonstrate many more possibilities than were pointed out in the examples then available. Another booklet published by this company deals with zinc metals and alloys. It describes the physical properties and chemical compositions of various die casting alloys, contains a short treatise on the die casting process in general together with discussions of dimensional stability and corrosion resistance.

The Division of Simplified Practice of the National Bureau of Standards has announced that simplified practice recommendation R87-32, forms for concrete joist construction floors, has been reaffirmed without change by the standing committee of the industry.



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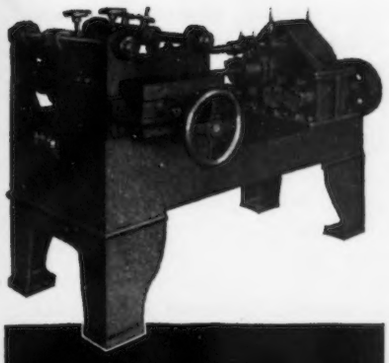

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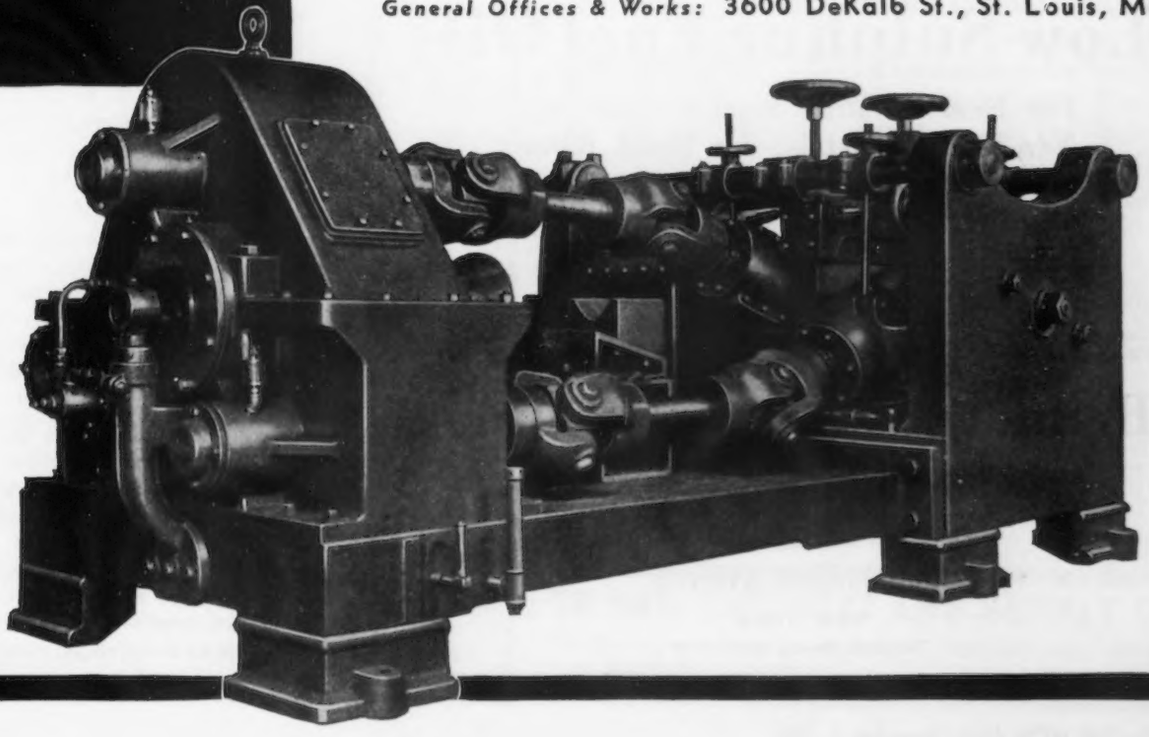

A New Soaking Pit

(CONTINUED FROM PAGE 51)

operated with such controls to heat the steel in an atmosphere ranging from highly reducing to highly oxidizing, depending upon the type of product desired. Thus also is the type of scale to be formed in the pit under the control of the operator at all times. A thin tight scale or a thick heavier scale may be formed at will according to production and rolling requirements.

A further feature which has proved beneficial is that of automatically stopping and starting the fuel regulated by the opening and closing of the cover during the charging and drawing of the ingots.

The description of this new pit is incomplete without a word about the method of bottom maintenance. The operation produces only a small amount of slag and this is produced chiefly by occasional fins on the butts of the ingots. The slag forms in a central ring between the firing port and the pit side walls. Clean-out holes are located around this ring. The bottom need be replaced only once each week, and this is done with the aid of a special tool which has been designed for that purpose. This tool is manipulated by the stiff-leg pit crane which lifts and lowers the tool with a chopping and rotary motion. This action eliminates the possibility of any large pieces of slag clogging the clean-out holes, and is done before opening the clean-out holes to prevent chilling cold air affecting the slag formation. After the clean-out holes are opened the crane drags the remaining slag across the hearth to the holes. The holes are then closed and fresh coke braize added by means of a bottom dump box manipulated by the crane. The entire operation takes only from an hour to an hour and a half and the time saving permits the pit to produce one to one and a half additional heats each 24 hours in comparison to equivalent operation of regenerative pits. This is effective in lowering the overall fuel rate.

The object of recuperation, namely the utilization of the waste gases of combustion to preheat the inflowing air of combustion, seems simple enough. The attainment of this objective has generally been accompanied by a number of difficulties. However, after 20 years of experience with preheating devices, the Amco recuperator has been designed by the same engineers who conceived the soaking pit. This recuperator has been found to be perfectly adaptable not only to soaking pits but to a wide variety of heating furnaces. Fig. 3 illustrates both the construction and operation of the recuperator. The waste gases enter all the flues simultaneously (Fig. 4) and encounter the cooling effect of *all* the air being preheated. This is important in that it contributes to longer life by minimizing the "shock" of a localized hot gas flow. The use of electrocast mullite and super-refractories in the high temperature area has a similar effect, while increasing the actual air preheat temperatures. A hollow tile flue unit construction, in which the units are spaced to insure uniform heating and counter-cooling, eliminates unequal heating found in tile settings in which the refractory is not exposed on all sides. This, of course, also prevents internal stresses which cause leakage and failure. As a further safeguard against leakage all joints in the recuperator tile setting are horizontal and are sealed by modern air setting cements aided by the weight of the structure and a patented joint and lock seal.

Thin walls with a porosity of 9 per cent give the recuperator excellent conductivity and low internal stresses, and make it exceptionally responsive to varying load and temperature conditions.

As a final feature, the recuperator is adaptable (as is the soaking pit) to all types of fuel and can compensate for a normal variation in volumes of air to be preheated and waste gases to be removed, to maintain desired air and waste gas temperature differentials and gas pressures, thereby eliminating temperature extremes which are destructive to tile. Furnace temperatures up to 2800 deg. F. have been handled successfully by this recuperator.

Two views of the new soaking pit in actual operation are shown in Figs. 5 and 6. The one view demonstrates the uniformly heated condition of the ingots and the other shows the accurate stabilized wall of the pit.

Since the actual facts and figures of practical experience are always more desirable than theory, the data shown in Tables I and II, which were obtained in the plant of a large Pittsburgh corporation, should be of interest. Table I shows fuel requirements of the pit and Table II lists comparative data on the making of bottom.

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Fig. 754

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JUST BETWEEN US TWO

Brickbat

A CHICAGO admirer (anonymous) writes: "The trouble with you is you talk too much about things you don't know a G— —— thing about."

The reader is always right. Our head is bowed. But when he follows up with the advice that we write only about things we know something about he is going a bit too far. Think what would happen if a movement like that spread. Millions of printers would be thrown out of work. The paper industry would be prostrated. The man is evidently a borer from within.

He Invites Us Into His Webb

WHAT annoys our Chicago admirer is the innocent little item published here Nov. 19 implying that under a controlled economy the Committee on Light Industries might treat lightly a request for funds to erect a plant for making broomholders.

He says we are mistaken and refers us to the Webbs' recent book on the U.S.S.R. We have almost finished observing Scarlett O'Hara's gradual petrifaction and will tackle the Webbs' study next. But we know in advance that it won't do any good, for our mind is already made up. "The bigger the organization the more the red tape" is a conviction of ours. We are very fond of it and wouldn't part with it for anything.

Word Welders

WE have always envied Time, Winchell and others their knack of telescoping words, e.g., *anecdotage, servistation, Hollywoodoll, cinemaddict,* etc. So we tried our hand at it and this is what came out—*trade paperfection, Iron Agent, trade papereader, editoracle.* It seems foolish to us, too.

Boast

WHILE Father Coughlin's fan mail is probably shrinking like a stuck bladder ours is becoming positively bloated. Four this week—a 100 per cent gain. The pearl from Chicago is No. 1. No. 2 is from Philip C. Sowersby of GE, Schenectady, who wants to know the outcome of the lecture, "Is Human Nature a Success or Failure?" We are checking up on it.

The third is from another anonymous correspondent in Huntington, W. Va., who signs himself "An Illiterate Fan," but belies the signature by using such polysyllabics as *paraphrased, delicious,* and *abundant.* True, he did spell it "abundent" first and later corrected it, but that does not prove anything. He is probably a pundit, and doubtless would have no trouble at all in punctuating this sentence so that it will make sense, *"Time flies you cannot they are too erratic."*

He might even be able to tell us offhand what Fortune means by this reference to the shipbuilding industry (page 72, November issue):

> *"Too arcane to enter haphazardly, it is also too proud of its heritage to collude."*

Immortal Fish

THEN there is No. 4 from R. B. Nuckols of Standard Tool, Cleveland. He solves the fish problem with one hand tied behind his back, and adds:

> *"I am the quintessence of modesty myself and am not putting in my bid for classification with the mental giants or phenomenons having an I.Q. in five figures. Maybe this last crack will give you a hint on why I am wondering what lapse you suffered when allowing that elementary 'puzzle' (?) to appear in the Oct. 29 issue."*

We still refuse to apologize for the fish problem, and contend that if time is taken into consideration a simple problem is as revealing as a difficult one. Anyone can run a hundred yards in ten minutes. The following is admittedly elementary but if you can solve it in 93 seconds you can properly consider yourself among the elect:

> *A farmer wishes to transport a fox, a chicken and a bag of corn across a river. His boat will hold only one at a time. If he leaves the fox and chicken together the first will eat the second. Ditto if he leaves the chicken and corn together.*

Plaint

THIS is to bemoan the fact that the demand for our Oct. 15 issue, the National Metals Show Number, exhausted our supply. Our shelves are swept clean and there are still people who want copies. Which is a source of no wonderment to us, as it seemed to us to be one of the finest issues we ever published.

—A.H.D.

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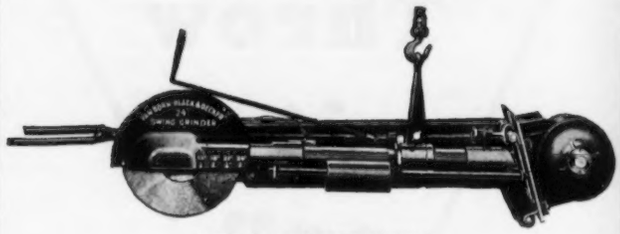

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